UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

MEMORANDUM:

To: Virna Stillwaugh, Ph.D., Entomologist

From: Kevin Ulrich, Ph.D., Entomologist

Secondary Review: Jennifer Saunders, Ph.D., Senior Biologist

Date: 7/25/2019

Subject: PRODUCT PERFORMANCE DATA EVALUATION RECORD (DER)

THIS DER DOES NOT CONTAIN CONFIDENTIAL BUSINESS INFORMATION

Note: MRIDs found to be **unacceptable** to support label claims should be removed from the data matrix.

DP barcode: 452123
Decision no.: 547950
Submission no: 1030293
Action code: R310
Product Name: A21741A INSECTICIDE (ABN: Advion Fly Bait)
EPA Reg. No or File Symbol: 100-RALL
Formulation Type: Granular Bait
Ingredients statement from the label with PC codes included:
Indoxacarb 0.50% PC: 067710

Application rate(s) of product and each active ingredient (lbs. or gallons/1000 sq ft or per acre as appropriate; and g/m^2 or mg/cm^2 or mg/kg body weight as appropriate):
1.6 to 6.4 oz product/1000 ft^2 (~0.008 to 0.032 oz A.I./1000 ft^2); 0.5 to 2 g/1 m^2 (~0.0025 to 0.01 g A.I./1 m^2).

Use Patterns: For use in and around residential, commercial and agricultural structures. Use in waste-storage areas around commercial establishments including restaurants, taverns, hotels, grocery stores, supermarkets, bakeries, warehouses, and sport complexes; commercial operations including canneries, beverage-processing plants, dairy-, meat-, and poultry-processing plants, fruit- and vegetable-processing plants, seafood-processing plants, tanneries, rendering plants, grease-collection stations, kennels, schools, recycling plants, military installations and refuse dumpsters associates with these establishments; agricultural-production facilities including feedlots, dairies, poultry/broiler houses, swine-production structures, livestock-housing and horse stables. For use in in residential structures and non-food and non-feed areas of commercial, industrial, public, agricultural and institutional buildings/structures, including restaurants, warehouses, food- and feed-processing plants, supermarkets, hospitals, nursing homes, motels, hotels, schools, daycares, laboratories, computer facilities, aircraft, buses, boats/ships, trains, pet shops and zoos. For indoor areas of residential, institutional, public, agricultural buildings/structures, or food and feed-handling area, apply using bait stations or as a water-diluted bait (paint-on or rope wick) or to sticky cards.

I. Action Requested: MRID 50528507 and 50528519 are reviewed to determine if efficacy claims against flies of public health significance are supported.

II. Background: Registrant submitted studies to support claims of efficacy against house and blow flies using a new end-use product, Advion Fly Bait (A21741A INSECTICIDE).

III. MRID Summary:

MRID #50728507. Advion Fly Bait (A21741A) – Efficacy Data to Support Use of Advion Fly Bait for Control of Flies, TK0256395, (A21741A_50031). This MRID contains 17 different studies.
(1) **Non-GLP**

(2) **Methods:** 17 trials were conducted.

1. Five replications of 25 each 2 to 7-day old adult mixed sex house flies (*Musca domestica*) were exposed to four bait formulations, A21746A (fly bait blank), A21740A (A.I. = 0.2%), A21741A (A.I. = 0.5%, Advion Fly Bait EUP) and A20780A (Zyrox Granular Fly Bait). Baits were either fresh or aged 7 days outdoors in 100-mm petri dishes at ambient temperature and sunlight (25 to 62°F and 24 to 100% RH) but protected from rain. Bait (3.2 oz/1000 sq ft) and alternate food and water sources were placed in 1x1-ft screen cages. Flies were not starved prior to bait exposure. The total number of alive, knockdown, and dead flies were recorded at 5, 10, 30, and 60 min, and at 3, 6, 24, 48, 72, and 96 hr bait exposure. The test was conducted at 66 to 70°F and 37 to 50% RH.

2. Five replications of 100 each 2 to 7-day old mixed sex adult house flies (*Musca domestica*) were exposed to four fly bait products, A21740A, A21741A (Avion Fly Bait EUP), A21746A, and Zyrox. Baits were fresh or aged 7 days outdoors in 10-cm petri dishes at 52.9 to 119.0°F and <20% to 100% RH. Flies were exposed to 0.2 or 1.0 g of bait/cage for up to 96 hr. One cage received no bait to serve as a negative control. Alternate food and water sources were provided. Flies were not starved prior to bait exposure. Moribund and dead flies were accessed at 1, 3, 6, 24, 48, 72, and 96 hr bait exposure.

3. Five replications of 100 each 2 to 7-day old house flies (*Musca domestica*) were exposed to four bait formulations, A21746A (fly bait blank), A21740A, A21741A (Advion Fly Bait EUP), and A20780A (Zyrox fly granular bait). Baits were fresh or aged 7 days outdoors in ambient conditions and protected from the rain. Bait (3.2 oz/1000 sq ft) in petri dishes was placed inside 18x18x18-in cages. Untreated control groups consisted of empty dishes. Flies were provided with an alternate food source of 50% sucrose and powdered milk and ad libitum water. Flies were not starved prior to bait exposure. Mortality and morbidity were accessed at 30 and 60 min and 3, 24, 48, 72 and 96 hours after bait placement. Tests were conducted at 22 ± 5°C and 30 to 90% RH in 12 hr L:D.

4. Five replications of 50 each 2 to 4-day old mixed sex house flies (*Musca domestica*) were placed into the 12x12x12-inch or 18x18x18-inch cages and exposed to two rates (1.6 oz/1000 square ft and 3.2 oz/1000 square ft) of A21741A fly bait (0.5% indoxacarb) in shallow containers. Untreated flies fed a laboratory diet of 50:50 powdered milk: sugar were used for the negative controls. All test and control cages contained a food and water source as a choice. Flies were not starved prior to bait exposure. The tests were conducted at either 79 to 84 °F and 49 to 58% RH, 74 to 80°F and 41 to 44% RH, or 72 to 77°F and 53 to 66% RH. The number of moribund and dead flies was assessed at 30 min, and at 1, 3, 6, 24, 48, 72, 96 and 168 hr, or until 100% mortality was observed. This trial was repeated at three separate locations for a total of 15 replications.

5. Five replications of 50 mixed-sex house flies (*Musca domestica*) were exposed to three rates of A21741A (0.046, 0.091, or 0.182 g/sq ft), Zyrox (0.092 g/sq ft), QuikStrike (0.227 g/sq ft), an indoxacarb blank (0.091 g/sq ft), or an empty dish (no-bait negative control). Baits were evenly dispersed among four weigh boats and placed inside 12x12x12 in cages with unlimited access to food and water. Flies were not starved prior to bait exposure. Alive and dead flies were recorded at 10 and 30 min, and at 1, 3, 6, 24, 48, 72, and 96 hr. The test was conducted at 28.9°C and 40% RH.

6. Five replications of 20 adult mixed sex 2 to 3-day old, house flies were exposed to four rates of A21741A (1.6 oz, 3.2 oz, 6.4 oz/1000 sq ft, and blank A21741A lacking indoxacarb), Zyrox Fly Bait

(3.2 oz/1000 sq ft), and Maxforce Fly Bait (5.7 oz/1000 sq ft) in 8-in diameter x 7 in high round jars. Baits were scattered over the bottom of test jars. Flies were not starved prior to bait exposure. Mortality was observed at 10 and 30 min, and at 1, 3, 6, and 24 hr exposure. Environmental conditions were not reported.

7. Five replications of 25 2 to 5-day old adult mixed sex house flies (*Musca domestica*) were exposed to A21746 (blank no indoxacarb) (3.2 oz/1000 sq ft), A21741 (1.6 oz/1000 sq ft, 3.2 oz/1000, and 6.4 oz/1000 sq ft), Zyrox (3.2 oz/1000 sq ft), or QuickBayt (5.7 oz/1000 sq ft). Arenas consisted of 1x1 ft metal screen cages supplied with 60 mm petri dishes to hold bait and 50:50 powdered milk:sugar for food. Flies were not starved prior to bait exposure. Alive, moribund, and dead flies were recorded at 10 and 30 min, and at 1, 3, 6, 24, 48, 72, 96, and 120 hr. The test was conducted at 71°F and 59% RH. NOTE: It is not reported if moribund individuals were considered dead for the summary table and analysis.

8. Five replications of approximately 100 per replication 2 to 7-day old mixed-sex adult house flies (*Musca domestica*) were placed into 18x18x18 in wire mesh cages containing a 12x12 in paper towel, 8-oz water cup with wadded paper towel, and a container of dry milk:sugar diet and allowed to acclimate for 3 to 24 hr before bait introduction. Baits were placed into each cage in equal amounts into five weigh boats. Amounts, products, and active ingredients tested are shown in Table 1. The number of alive, moribund and dead flies were recorded at 10 and 30 min, and at 1, 3, 6 24, 48, and 72 hr exposure. The authors do not report if moribund flies were treated as alive or dead in the summary tables. The test was conducted at 68.2 to 80.8°F and 37 to 67% RH.

Table 1.

Product	Application rate (oz product/1000 sq ft)	a.i. concentration	Amount applied/cage (g)	a.i. rate
A21746	3.2	(blank)	0.2	0 mg/cage
A21741	1.6	0.5 % indoxacarb	0.1	0.5 mg/cage indoxacarb
A21741	3.2	0.5 % indoxacarb	0.2	1.0 mg/cage indoxacarb
A21741	6.4	0.5 % indoxacarb	0.4	2.0 mg/cage indoxacarb
Zyrox	3.2	0.5% cyantraniliprole	0.2	1.0 mg/cage cyantraniliprole
QuikStrike	3.2	0.5% dinotefuran + 0.04% (z)-9-tricosene	0.2	1.0 mg/cage dinotefuran + 0.08 mg/cage (z)-9-tricosene

9. Four replications of one hundred 2 to 4-day old adult, unstarved mixed sex house flies (*Musca domestica*) were released into a 10x8x7-ft test kitchen (80 sq ft floor area) and maintained at 79ºF and 27% RH. Food (50:50 powdered milk:sugar) and water were provided for the duration of the study. Granular bait in shallow plastic trays was set on the floor in the center of the kitchen. Amounts, products, and active ingredients tested are shown in Table 2. Fly mortality (criteria not identified) was observed at 10 and 30 min, and 1, 3, 6, 24, and 48 hr.

Table 2.

Product	Application rate (oz product/1000 sq ft)	a.i. concentration	Amount applied/cage (g)	a.i. rate
A21746	3.2	(blank)	7.2	0 mg/cage
A21741A	1.6	0.5 % indoxacarb	3.6	18 mg/cage indoxacarb
A21741A	3.2	0.5 % indoxacarb	7.2	36 mg/cage indoxacarb
A21741A	6.4	0.5 % indoxacarb	14.4	72 mg/cage indoxacarb
Zyrox	3.2	0.5% cyantraniliprole	7.2	36 mg/cage cyantraniliprole

Maxforce Fly Bait	5.7	0.6% imidacloprid	13	78 mg/cage imidacloprid

10. Five replications of 250 2 to 3-day old adult mixed sex house flies (*Musca domestica*) were released into 10x10x7-ft screen tents (100 sq floor space) containing a source of water and food (1:1 sugar: powdered milk). Food and water were provided for the duration of the study. The following six bait treatments (no active ingredient identities or concentrations were reported) were placed inside the screen tents: A21741A (4.54 g at 1.6 oz/1000 sq ft, 9.07 g at 3.2 oz/1000 sq ft, and 18.14 g at 6.4 oz/1000 sq ft), Zyrox Fly Granular Bait (9.07 g at 3.2 oz/1000 sq ft), and QuikStrike Fly Bait (22.7 g at 4 oz/500 sq ft). Alive, moribund, and dead flies (criteria not reported) were recorded at 10 and 30 min and 1, 3, 6, 24, 48, and 72 hr. Moribund flies were not included in the number of dead. Tests were conducted at 67.05 to 105.93°F and 10.15 to 68.91% RH.

11. Five replications of 100 each 2 to 4-day old mixed sex house fly (*Musca domestica*) adults were released into 10x8x7-ft test kitchens (980 sq ft floor area) and maintained at 79ºF and 27% RH. Food (50:50 powdered milk:sugar) and water were provided for the duration of the study. Bait treatments included: Zyrox Fly Bait (A20780A, 7.4 g at a rate of 3.2 oz/1000 sq ft), A21741A (7.4 g at a rate of 3.2 oz/1000 sq ft), an unreported amount of blank bait (A21746A INDX), and an unreported amount of Maxforce Fly Bait (0.5% imidacloprid) applied in an FBS station. Unless otherwise noted, each product and rate were tested as both a scatter application and inside FBS stations. Flies were not starved prior to bait exposure. Fly mortality (criteria not identified) was observed at 10 and 30 min, and 1, 2, 4, 8, 24, and 48 and 72 hr.

12. Five replications of 200 2 to 3-day old mixed sex house flies (*Musca domestica*) per treatment were placed in 3x3x4 ft screen cages (9 square feet floor area) and supplied with water and food (1:1 powdered milk: sugar) for the duration of the study. For each treatment one of four baits were added to cages. A21746 (blank), A21741 and Zyrox (3.2 oz/1000 sq ft application rate for all treatments) was applied as either a scatter application or inside fly bait stations. Maxforce (6.0 oz/1000 sq ft application rate) was only tested in bait stations. Unstarved flies were released into cages at a maximum 32.2ºC (± 3º) and minimum 21ºC (±2º) at 40% RH and photoperiod of 12L: 12D. The total number of moribund and dead (neither criteria defined) flies were counted at 0.5, 1, 3, 6, 24, 48, 72, 96, and 168 hr.

13. Estimated counts of natural field populations of house fly (*Musca domestica*) in five swine barns (84 to 174 m^2 floor area each) were made using sticky ribbon traps (one per 19 m^2 (4 to 9 per building)) for 24 hr at three daily intervals prior to bait application. Indoxacarb Fly Bait (0.5% indoxacarb) was dispensed using Apache Fly Bait Stations at a rate of 6.4 oz/1000 sq ft. The efficacy of treatments was evaluated at 1 day and 1, 2, and 3 weeks following bait introduction by counting flies in sticky ribbons. The author reported start and end sample counts for comparisons. Environmental data were not presented.

14. Three replications per treatment of 100 (actual: 75 to 96) 3 to 6-day old mixed-sex insecticide-susceptible house flies (*Musca domestica*) were released into 30-cubic meter test chambers supplied with a water source and granulated sugar supplied for the study duration. Unreported amounts of A21741A (0.5% indoxacarb), Zyrox Fly Granular Bait (0.5% cyantraniliprole) or Agita 1GB (1.0% thiamethoxam) in Apache Fly Bait Stations were placed into the test chambers. Granulated sugar was used as negative controls. Knockdown (unable to upright itself or perform coordinated directional movement) was recorded at 1, 2 and 4 hr. Dead flies (displaying no response to tactile stimulus, including any observation of twitching or moving any appendage) were recorded at 24, 48, 72 and 96 hr. There is no indication if a moribund condition was observed, or if specimens fitting a moribund definition were classed as dead or knocked down in the data collection. The test was conducted at 24.5 to 27.5 °C and 27.8 to 80.3% RH.

15. Four replications per treatment of 200 mixed-sex adult 2 to 6-day old house flies (*Musca domestica*) were released into outdoor screened pavilions 3x6x3.5 m (18 sq m floor area) and supplied with two containers of granulated sugar and two containers of wetted tissue for the duration of the study.

Granular fly baits were tested at the rates for granular or paint-on treatment as indicated in Table 3. For the paint-on formulations, the granular were dissolved in water then painted onto four 30x30-cm cardboard pieces, which were hung in each pavilion. The negative control group consisted of pavilions supplied with food and water but no bait treatments. Knockdown (unable to right itself) was assessed 15, 30, 60, 120, 180, and 240 min, and mortality (no observable movement for 3 seconds) was assessed at 24 hr following bait introduction. The test was conducted at ambient outdoor conditions, 14.8 to 36.4 °C and 35 to 79% RH. Flies were not starved prior to bait exposure.

Table 3.

Bait	a.i. concentration	Granular Application rate (g/pavilion)	Granular a.i. rate (mg/pavilion)	Paint on mix rate (g/pavilion)	Paint on a.i. rate (mg/pavilion)
A21741A	0.5% indoxacarb	36	180	50	250
A21741A	0.5% indoxacarb	18	90.0	25	125
Zyrox	0.5% cyantraniliprole	36	180	50	250
QuickBayt	5.0% imidacloprid + 1.0% (Z)-9-tricosene	36	1800 + 360	50	2500 + 500

16. NOTE: Registrant proposes to bridge application method because Zyrox and Advion Fly Bait have identical bait matrices. Tested products did not include A21741A INSECTICIDE (ABN: Advion Fly Bait). The two products do not contain the same active ingredient.

    Five replications of 20 per replicate 2 to 5-day old adult mixed-sex house flies (*Musca domestica*) were placed in 1x1x1 ft screen cages (6 sq ft surface area) and supplied 10% sucrose and water. Zyrox Fly Granular Bait was applied either as a granular scatter application (3.2oz/1,000 sq ft) in a 60 mm plastic Petri dish, or in a paint-on application by dissolving 0.59 g Zyrox in 1.227, 0.614, or 0.413 ml water to form a paste that was painted onto 10x10-cm cardboard squares. Untreated control replicates received no baits. Food and water were provided during the trial. The number of alive, moribund, and dead (criteria not defined) flies in each cage was recorded at 1, 6, 24, 48, 72, and 96 hr. The test was conducted at 72 °F and 48% RH.

17. NOTE: Registrant proposes to bridge application method because Zyrox and Advion Fly Bait have identical bait matrices. Tested products did not include A21741A INSECTICIDE (ABN: Advion Fly Bait). The two products do not contain the same active ingredient.

    Five replications of 20 per replicate 2 to 3-day old mixed-sex adult house flies (*Musca domestica*) were released into 1x1x1-ft cages containing a water-soaked cotton ball and 5: 5 mixture of powdered milk: sugar at 25 ± 2 ºC and 50 ± 10% RH. Food and water were provided for the study duration. Zyrox Fly Bait, Maxforce Fly Bait, and water-only controls were applied as paint-on applications (0.5 to 1.5 oz bait/1 oz water) to wood and ceramic tile surfaces and to absorbent rope-wick. Granules of Zyrox and Maxforce were evenly applied on sticky cards (rate of 6.4 oz/1000 sq ft). All treatments were allowed to dry overnight. Fly mortality (criteria not defined) was assessed at 2, 4, 6, 8 and 24 hr exposure. Moribund individuals were not noted.

(3) **Results:**

1. Exposure to fresh baits (3.2 oz/1000 sq ft) of A21740A (A.I. = 0.2%), A21741A (A.I. = 0.5%, Advion Fly Bait EUP), and A20780A (Zyrox Granular Fly Bait) caused ≥90% mortality within 72, 72 and 96 hr, respectively. Exposure to aged A21740A, A21741A, and A20780A (Zyrox Granular Fly Bait) caused ≥90% mortality within 96 hr for each product. <10% mortality was observed in both the fresh and aged blank bait after 96 hr.

2. Exposure of house flies to fresh or aged bait A21740A, A21741A (3.2 oz/1000 sq ft) caused ≥90% mortality within 48 hr. Exposure of house flies to 0.2 g/cage aged A21741A caused ≥90% mortality within 48 hr, and to not aged A21741A within 48 hr. Exposure of house flies to fresh and aged Zyrox (3.2 oz/1000 sq ft) caused ≥90% mortality within 48 and 72 hr, respectively. Mortality of untreated controls and blank bait was <10% during the study.

3. Exposure of house flies to fresh and aged A21741A bait caused ≥90% mortality within 48 hr. Untreated and blank control group morality did not exceed 10%.

4. Exposure to 1.6 or 3.2 oz/1000 sq ft A21741A fly bait (0.5% A.I.) caused ≥90% mortality within 48 hr. Untreated and blank control group morality did not exceed 10%.

5. A21741A (0.046, 0.091, or 0.182 g/sq ft) caused >90% mortality in 48 hr. Zyrox (0.092 g/sq ft) and QuikStrike (0.227 g/sq ft) exposure caused over 90% mortality in 72 hr. The indoxacarb blank and empty bait dish treatments had <10% mortality at 96 hr.

6. Exposure of house flies to A21741A (1.6, 3.2, and 6.4 oz/1000 sq ft) and Zyrox Fly Bait (3.2 oz/1,000 sq ft) caused ≥90% mortality within 24 hr. Maxforce Fly Bait (5.7 oz/1,000 sq ft) caused ≥90% mortality within 30 min. A21741A blank control had less than 10% after 24 hours.

7. Exposure of house flies to A21741 caused ≥90% mortality within 120 hr; only 3.2 oz/1000 sq ft achieved ≥90% in 96 hr. Exposure of house flies to Zyrox or QuickBayt did not cause ≥90% mortality within 120 hr. Control mortality did not exceed 10% mortality within 120 hr.

8. Exposure of house flies to granular fly baits A21741A (3.2, and 6.4 oz/1000 sq ft) caused ≥90% mortality in 72 hr. 90% mortality within 96 hr was not achieved in trails exposed to A21741A (1.6 oz/1000 sq ft), Zyrox, and Quikstrike. Control mortality was <10% after 96 hr.

9. Exposure of house flies to A21741A (1.6 oz, .2 oz, and 6.4 oz/1000 square feet) caused ≥90% mortality within 48 hr, and Zyrox Fly Bait (3.2 oz/1000 square and Maxforce Fly Bait (5.7 oz/1000 square feet) caused ≥90% mortality within 24 hr. Control mortality was <10% at 48 hr.

10. Exposure of house flies to A21741A (1.6 oz, .2 oz, and 6.4 oz/1000 square feet, Zyrox Fly Bait (3.2 oz/1000 square and QuikStrike Fly Bait (4 oz/500 square feet) caused ≥90% mortality to house flies within 24 hr. Control mortality did not exceed 10% after 96 hr.

11. Indoxacarb fly bait (A21741A, 3.2 oz/1000 square feet) applied as scatter caused ≥90% mortality within 48 hr, the same amount of A21741A applied in an FBS bait station (37.0 mg/kitchen indoxacarb) did not cause ≥90% mortality within 72 hr. The blank bait (A21746A INDX) applied as scatter caused ≥10% mortality within 72 hr, and blank bait (A21746A INDX) applied in FBS station caused ≥10% mortality within 72 hr.

12. Exposure of house flies to A21741 bait (3.2 oz/1000 sq ft) caused ≥90% mortality within 24 hr as a scatter application and within 48 hr in bait stations. Exposure of house flies to Zyrox bait caused ≥90% mortality within 24 hr as a scatter application but did not cause ≥90% mortality within 168 hr in bait station applications. Exposure of house flies to Maxforce Flay Bait in bait stations did not cause ≥90% mortality within 168 hr. Exposure of house flies to A21746 fly bait (blank) as scatter or in bait stations did not cause ≥10% mortality within 168 hr.

13. Baiting with Indoxacarb Fly Bait dispensed at a rate of 6.4 oz/1000 square feet caused ≥90% reduction in house flies recovered in sticky traps relative to initial counts within 2 weeks. No non-baited control facilities were tested.

14. Exposure of house flies to Agita 1GB (1.0% thiamethoxam) and Zyrox (0.5% cyantraniliprole) caused ≥90% mortality within 24 hr, while exposure to A21741A (0.5% indoxacarb) caused ≥90% mortality

within 48 hr. Control mortality did not exceed 10%. Knockdown was not achieved within 4 hr for any treatment.

15. Exposure of house flies to granular or paint-on bait treatments did not cause ≥90% knockdown within 240 min. Exposure of house flies to granular A21741A at 50 g/pavilion indoxacarb caused ≥90% mortality within 24 hr, and exposure to paint-on formulations of A21741A of 50 g and 25 g/pavilion indoxacarb caused ≥90% mortality within 24 hr.

16. Exposure of house flies to Zyrox paint-on and scatter bait treatments resulted in ≥90% mortality within 96 hr. Control mortality was >10% at 96 hr.

17. Exposure to the Zyrox and Maxforce paint-on treatments caused ≥90% mortality within 24 hr. Control mortality was >10% at 24 hr.

(4) **Conclusion: Partially acceptable.** A combination of aboratory, semi-field, and field data produced sufficient data to support the claim that Advion Fly Bait, A21741A, bait kills house flies. When applied as a scatter bait or paint-on application, >90% mortality was achieved within 48 hours using the lowest application rate (1.6 oz product/1000 sq ft). Scatter bait applications remained effective when aged outdoors for 7 days and protected from rain. In 2 of 3 trials, the product produced >90% mortality when used in bait stations at a rate of 3.2 oz/1000 sq ft. There is insufficient data showing quick kill or knockdown of Advion Fly Bait. Studies 16 and 17 are supplemental. In addition to non-active ingredients, active ingredients are equally important for palatability. Dissolved Advion Fly Bait applied to rope may exhibit different characteristics than granular bait. Zyrox and Advion data cannot be bridged. Lastly, 5 replicates of 50 individuals are recommended for fly studies. Studies 1, 6, and 7 tested fewer individuals per replicate.

MRID #50728519. Advion Fly Bait (A21741A) – Efficacy Data to Support Use of Advion Fly Bait for Control of Blow Fly, TK0256395, (A21741A_50053).

(1) **Non-GLP**

(2) **Methods:** Five replicates each of 50 mixed sex blow flies (*Calliphora* spp.) were released into 60x58x60 cm cages containing water and sugar. Advion Fly Bait (A21741A) at a rate of 6.4 oz/1000 sq ft was added to the cages. Control treatments contained only sugar and powdered milk. Mortality was recorded at 1, 2, 24, 48, 72 and 96 hr after exposure.

(3) **Results:** 100% mortality was observed at 72 hr in A21741A-treated cages. Control mortality did not exceed 10%.

(4) **Conclusion: Partially acceptable**. Data support that the bait kills blow flies indoors. >90% mortality was achieved at 72 hr using the highest application rate (6.4 oz/1000 sq ft). Bait was not aged or tested outdoors. No data is presented showing blow flies and house flies will respond similarly to aged baits.

IV. EXECUTIVE DATA SUMMARY:

Laboratory, field, and semi-field data were submitted for house and blow flies. The data indicate that the proposed bait kills house flies indoors and outdoors when applied using scatter or paint-on methods at a rate 1.6 oz/1000 sq ft and when used in bait stations at a rate of 3.2 oz/1000 sq ft. When protected from rain, the product controls house flies for up to 7 days when applied as a granular bait. Blow fly indoor kill claims for Advion Fly Bait are supported when applied as a scatter bait at a rate of 6.4 oz/1000 sq ft. For blow flies, data do not support control (residual) or outdoor claims. Rope wick, glue board, and sticky card applications are not supported for either pest.

V. LABEL RECOMMENDATIONS:

(1) Make the following changes in Direction for Use:

Specify outdoor bait applications must be protected from rain

Specify bait station application rates as 3.2 to 6.4 oz per 1,000 sq ft

Specify blow fly application rate as 6.4 oz per 1,000 sq ft

Specify applications against blow flies in for indoor-use only

Remove Rope-Wick, glue boards, and sticky card application instructions

(2) The following marketing claims are acceptable:

Controls house flies

Kills house flies

Kills blow flies indoors

Provides an alternative mode of action for insecticide resistance management

Can be an important tool in an integrated pest management program

(3) The following marketing claims are unacceptable:

Controls blow flies

Controls neonicotinoid insecticide-tolerant flies

(4) The following MRIDs should be removed from the data matrix, as they are classified as "unacceptable" to support the product: N/A

(5) Other comments/recommendations:

Note to PM: DFU for bait stations (5.1.2) state that the amount of bait should be "as much bait as required to fill stations" *and* "the equivalent of 0.4 lb (6.4 oz)[…]per 1000 sq ft in stations. The label does not specify type of bait station however, based on efficacy data, rates should be at least 3.2 oz/1000 sq ft.

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 50528507. Advion® Fly Bait (A21741A) - Efficacy Data to Support Use of Advion Fly Bait for Control of Flies, B. Cartwright, 2019.

OCSPP Product Performance Guideline: 810.3500

Product Name: Advion Fly Bait
EPA Reg. No. or File Symbol: 100-RALL
Decision number: 547950
DP number: Not provided

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: Efficacy 2-1

Primary Reviewer:		
Gene Burgess, Ph.D.	Signature:	Gene Burgess GE
	Date:	06/12/2019
Secondary Reviewers:		
	Signature:	
	Date:	
Robert H. Ross, M.S., Project Manager	Signature:	Robert H. Ross RE
	Date:	06/12/2019
Quality Assurance:		
Angela M. Edmonds, B.S.	Signature:	Angela M. Edmonds
	Date:	06/12/2019

Disclaimer

This review may have been altered subsequent to the contractor's signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-16-019

EFFICACY STUDY DATA EVALUATION RECORD (COMPLETED STUDY) - Registration

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP GUIDELINE NO: 810.3500]
MRID:	50528507. Advion® Fly Bait (A21741A) - Efficacy Data to Support Use of Advion Fly Bait for Control of Flies, B. Cartwright, 2019.
DP BARCODE NO:	Not provided
DECISION NO:	547950
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	Since this volume is a summary of the attached files, Appendices 1-17, a Good Laboratory Practice Compliance Statement according to 40 CFR Part 160 is not applicable. There is no GLP study director for this volume.
SUBJECT PRODUCT:	PRODUCT NAME: Advion Fly Bait EPA REGISTRATION NUMBER OR FILE SYMBOL: 100-RALL FORMULATION TYPE: Granular bait ACTIVE INGREDIENT NAME: Indoxacarb 0.5 % [PC CODE: 067710] PRODUCT APPLICATION RATE(S) AS LABELED AND AS APPLICABLE TO THIS MRID: Flies, including house fly, blow fly, fruit flies: Granular: 1.6 to 6.4 oz/1000 square feet; Diluted paint on: dilute 30 to 40 grams bait in 30 ml water and apply as a spot treatment of 6 to 12-inch wide bands. ACTIVE INGREDIENT APPLICATION RATE(S): Flies, including house fly, blow fly, fruit flies: Granular: 227 to 907 mg/1000 square feet; Diluted paint on: not calculable on per-area basis.

Efficacy Study Data Evaluation Record

Study 1. Snell (2016). Evaluation of Aged Indoxacarb Concentrations on Granule Fly Baits.

Purpose of study

The purpose of the study was to evaluate the efficacy of indoxacarb fly bait to house flies.

Materials and Methods

This study was conducted in Meansville, Georgia on five replications of twenty-five (25) 2 to 7-day old adult mixed sex house flies (*Musca domestica*) from a purchased laboratory strain (source, rearing conditions and pesticide susceptibility status not reported). Four bait formulations, A21746A (indoxacarb fly bait blank), A21740A (NCA445432 GR (0.2)), A21741A (NCA445432 GR (0.5)), and A20780A (Zyrox Granular Fly Bait) (all products except the blank contained indoxacarb at unreported concentrations), were tested either fresh or after 7 days aging outdoors in 100-mm petri dishes at ambient temperature and sunlight (25 to 62 °F and 24 to 100% RH) but protected from rain. For testing, 0.09 g/cage of each fresh or aged fly bait were placed in 1 by 1-foot screen cages to approximate the labeled rate of 3.2 oz/1000 square feet bait. The total number of flies on the bait and the number of alive, knockdown, and dead flies (criteria not defined, and no mention of handling of any moribund individuals) inside the cage were recorded at 5, 10, 30, and 60 min, and at 3, 6, 24, 48, 72, and 96 hrs. The test was conducted at 66 to 70 °F and 37 to 50% RH. Mortality rates were based on the number of dead individuals and were statistically analyzed by using a two-tailed *t*-test at $p = 0.05$.

Results

Exposure to 0.09g/cage of fresh A21740A (NCA445432 GR (0.2)), A21741A (NCA445432 GR (0.5)), and A20780A (Zyrox Granular Fly Bait) caused ≥90% mortality within 72, 72 and 96 hr, respectively, and exposure to aged A21740A (NCA445432 GR (0.2)), A21741A (NCA445432 GR (0.5)), and A20780A (Zyrox Granular Fly Bait) caused ≥90% mortality within 96 hr for each product (Table 1). Control mortality did not equal or surpass 10% during this test. The raw data provided match the summary data provided in Table 1.

Table 1.

Table 1.

House Fly (*Musca domestica*)											
% Mortality											
Test Substances:	Pre-trt	5 min	10 min	30 min	1 hr	3 hr	6 hr	24 hr	48 hr	72 hr	96 hr
A21746A Fresh Bait	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%	2%
A21746A 7 Day Aged Bait	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	2%
A21740A Fresh Bait	0%	0%	0%	0%	0%	0%	0%	19%	77%	90%	98%
A21740A 7 Day Aged Bait	0%	0%	0%	0%	0%	0%	1%	5%	72%	87%	99%
A21741A Fresh Bait	0%	0%	0%	0%	0%	0%	0%	6%	74%	90%	98%
A21741A 7 Day Aged Bait	0%	0%	0%	0%	0%	0%	0%	9%	66%	88%	99%
A20780A Fresh Bait	0%	0%	0%	0%	0%	0%	0%	6%	62%	84%	95%
A20780A 7 Day Aged Bait	0%	0%	0%	0%	0%	0%	1%	12%	60%	77%	93%

The authors do not note any deviations from or amendments to the protocol.

Study 2. Donahue (2016). Evaluation of Aged Indoxacarb Concentrations on Granule Fly Baits.

Purpose of study

The purpose of the study was to evaluate the efficacy of fresh and aged indoxacarb granular fly bait against house flies.

Materials and Methods

This study was conducted in Modesto, California on five replications of 100 each 2 to 7 day old mixed sex adult house flies (*Musca domestica*) of the SRL Hilmar field collected strain maintained in the laboratory since 1994 with regionally field collected flies added periodically to maintain vigor (rearing conditions and insecticide susceptibility status not reported). Four fly bait products, A21740A, A21741A, A21746A, and Zyrox (active ingredient identities and concentrations were not reported) were either tested fresh or after 7 days aging outdoors by placing 0.2 or 1.0 g in 10-cm petri dishes at 52.9 to 119.0 °F and <20% and 100% RH [NOTE: These values from the raw data differ from those reported in the text]. The flies acclimated to 18 by 18 by 18-inch metal screen cages for 24 hr and then were exposed to the baits at 0.2 or 1.0 g bait per cage for up to 96 hr. One cage received no bait to serve as a negative control. The environmental conditions during the test were not reported. The number of moribund and dead flies (criteria not defined) were determined at 1, 3, 6, 24, 48, 72, and 96 hours bait exposure. The data were not statistically analyzed.

Results

Exposure of house flies to 0.2 g/cage aged A21740A caused ≥90% mortality within 48 hr, and to not aged A21740A within 48 hr. Exposure of house flies to 0.2 g/cage aged A21741A caused ≥90% mortality within 48 hr, and to not aged A21741A within 48 hr. Exposure of house flies to 0.2 g/cage aged A21746A did not cause ≥90% mortality within 48 hr, nor did to not aged A21746A within 48 hr. Exposure of house flies to 0.2 g/cage aged Zyrox caused ≥90% mortality within 72 hr, and to not aged Zyrox within 48 hr. Control mortality did not equal or surpass 10% during the study (Table 1 = Table 4 of MRID). The summary table matches the raw data.

Table 1.

Table 4. Average percent moribund/mortality of adult house flies at designated times after exposure to selected granular fly baits comparing fresh baits with aged baits applied at 0.2 g/cage in laboratory cage experiments. (n=5)

Bait Treatments (0.2 g/rep)	Percent Moribund/Mortality (n=5)													
	1Hour		3 Hour		6 Hour		24 Hour		48 Hour		72 Hour		96 Hour	
	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.
A21740A - Aged	0.0	0.0	0.0	0.0	0.6	0.0	21.0	49.4	1.9	93.6	0.0	97.9	0.0	98.1
A21740A - Not Aged	0.0	0.0	0.0	0.0	0.9	0.0	26.1	63.4	2.8	96.6	0.0	100.0	0.0	100.0
A21741A - Aged	0.0	0.0	0.0	0.0	0.4	0.0	27.9	47.8	3.3	93.1	0.9	98.0	0.0	98.9
A21741A - Not Aged	0.0	0.0	0.0	0.0	4.5	0.0	21.7	72.3	0.8	99.0	0.0	99.8	0.0	100.0
A21746A - Aged	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.0	0.0	1.0
A21746A - Not Aged	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	0.4
ZYROX - Aged	0.0	0.0	1.9	0.0	4.5	0.0	30.8	19.7	10.3	72.9	1.9	94.0	0.0	96.2
ZYROX - Not Aged	3.8	0.0	14.3	0.0	24.9	0.0	32.5	34.7	5.0	92.0	2.4	97.0	0.0	99.4
Untreated Controls	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

Exposure of house flies to 1.0 g/cage aged A21740A caused ≥90% mortality within 48 hr, and to not aged A21740A within 48 hr. Exposure of house flies to 1.0 g/cage aged A21741A caused ≥90% mortality within 48 hr, and to not aged A21741A within 48 hr. Exposure of house flies to 1.0 g/cage aged A21746A did not cause ≥90% mortality within 96 hr, nor did to not aged A21746A within 96 hr. Exposure of house flies to 1.0 g/cage aged Zyrox caused ≥90% mortality within 72 hr, and to not aged Zyrox within 48 hr. Control mortality did not equal or surpass 10% during the study (Table 2 = Table 5 of MRID). The summary table matches the raw data.

Table 2.

Table 5. Average percent moribund/mortality of adult house flies at designated times after exposure to selected granular fly baits comparing fresh baits with aged baits applied at 1.0 g/cage in laboratory cage experiments. (n=5)

Bait Treatments (1.0 g/rep)	Percent Moribund/Mortality (n=5)													
	1Hour		3 Hour		6 Hour		24 Hour		48 Hour		72 Hour		96 Hour	
	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.	Mori.	Mort.
A21740A - Aged	0.0	0.0	0.0	0.0	15.4	0.2	19.6	71.1	5.9	92.1	0.8	99.2	0.0	100.0
A21740A - Not Aged	0.0	0.0	0.0	0.0	10.5	0.0	20.1	71.1	2.1	95.2	0.2	99.8	0.0	100.0
A21741A - Aged	0.0	0.0	0.0	0.0	7.6	0.0	14.8	63.4	3.9	90.3	0.6	98.4	0.0	99.6
A21741A - Not Aged	0.0	0.0	0.0	0.0	22.2	0.0	6.2	85.0	0.6	99.4	0.0	100.0	0.0	100.0
A21746A - Aged	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.4	0.0	1.4
A21746A - Not Aged	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.6
ZYROX - Aged	2.4	0.4	15.0	1.6	28.1	3.2	36.0	37.0	17.6	77.5	2.6	96.6	0.0	99.2
ZYROX - Not Aged	7.8	3.6	23.8	3.1	40.8	3.6	35.2	44.5	8.3	90.6	0.9	98.9	0.0	100.0
Untreated Controls	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4

The author does not note any deviations from or amendments to the protocol.

Study 3. Younger (2016). A21746A, A21740A, A21741A and Zyrox Efficacy of Aged Granular Baits against House Flies.

Purpose of study

The purpose of the study was to study the efficacy of fresh and aged house fly baits.

Materials and Methods

This study was conducted in Sugar Land, Texas, on five replicates of 100 per replicate 2 to 7 day old house flies (*Musca domestica*) from a colony purchased from Benzon Research Inc., Carlisle, Pennsylvania (insecticide susceptibility status not reported). The flies were reared at 22 ± 5°C and 30 to 90% RH in 12 hr L:D on 1:1 sugar: powdered milk mixture with ad libitum water available. Four bait formulations, A21746A (INDX fly bait blank), A21740A, A21741A, and A20780A (Zyrox fly granular bait) (active ingredient identities and concentrations were not provided), were presented to the flies either fresh or following 7 days aging outdoors in ambient conditions and protected from the rain. The flies as described were placed in 18 by 18 by 18-inch cages 2 to 24 hours prior to bait introduction, at which time 204 mg of the baits to approximate a 3.2 oz/1000 square foot application rate were placed inside the cages in petri dishes. Untreated control groups consisted of flies presented an empty dish in the cage. The flies were provided with 50% sucrose and powdered milk and ad libitum water. Observations of mortality (no response to outside stimuli) and morbidity (displaying quivering or limited leg or antennal movement but otherwise immobile) were made at 30 and 60 minutes and 3, 24, 48, 72 and 96 hours after bait placement. Percentage mortality was determined by calculating the ratio of the number of dead (not dead + moribund) flies to the number of flies introduced, then multiplied by 100. The test was to be conducted at 22 ± 5°C and 30 to 90% RH in 12 hr L:D. Standard deviations and standard errors were calculated for the mortality data, but the data were not otherwise analyzed.

Results

Exposure of house flies to the baits and aging periods indicated caused ≥90% mortality within the number of hours reported in Table 1. The raw data match the summary tables provided in the MRID.

Table 1.

Treatment	**Hours to ≥90% mortality (or ≥10% for control)**
Control - Untreated	Not observed within 96 hr
A21746A - Fresh Bait	Not observed within 96 hr
A21740A - Fresh Bait	48
A21741A - Fresh Bait	48
Zyrox® FLY Granular Bait - Fresh Bait	72
A21746A - Aged Bait	Not observed within 96 hr
A21740A - Aged Bait	48
A21741A - Aged Bait	48
Zyrox® FLY Granular Bait - Aged Bait	48

The author does not report any amendments to or deviations from the protocol, although the number of flies tested per replication (100) differed from the number specified in the official protocol (50).

Study 4. Styer & Foard (2017). GLP Laboratory Bioassay to Determine the Efficacy of an Indoxacarb 0.5% Fly Bait against House Fly.

Purpose of study

The purpose of the study was to determine the efficacy of 0.5% indoxacarb formulation against house flies.

Materials and Methods

This study was conducted in Baltimore, Maryland, Modesto, California, and Meansville, Georgia on 5 replicates of 50 flies per replicate 2 to 4 day old mixed sex house flies (*Musca domestica*) of the Gainesville strain (pesticide susceptible, for the tests in Baltimore, reared in the laboratory of over 30 years in the i2L Research USA Inc. colony), Hilmar strain (pesticide susceptibility status not reported, for the Modesto tests, from the SRL in-house colony), or a laboratory colony (pesticide susceptibility status not reported, for the Meansville tests from a colony obtained from Benzon Research in Carlisle, Pennsylvania). Flies were placed into the cages described below 3 to 24 hr prior to bait introduction. A21741A fly bait (0.5% indoxacarb), was tested at two application rates in each of the three test sites: 1.6 oz/1000 square feet and 3.2 oz/1000 square feet by placing, into four to five shallow containers in the test cages for a total of 45.3 or 90.7 mg of the bait into a 1 by 1 by 1-foot cage (0.23 mg/cage indoxacarb or 0.45 mg/cage indoxacarb; Maryland and Georgia tests) or by placing 100 or 200 mg bait into a 1.5 by 1.5 by 1.5-foot cage (0.5 mg/cage indoxacarb or 1.0 mg/cage indoxacarb; Modesto test only). Untreated laboratory diet of 50: 50 powdered milk: sugar was used for the negative control groups, and all test and control cages contained a food and water source. The tests in Baltimore were conducted at 79 to 84 °F and 49 to 58% RH, in Modesto at 74 to 80 °F and 41 to 44% RH, and in Meansville at 72 to 77 °F and 53 to 66% RH. The number of moribund (exhibiting abnormal behavior and unable to move) and dead (displaying no movement when probed) flies was assessed at 30 min, and at 1, 3, 6, 24, 48, 72, 96 and 168 hr, or until 100% mortality was observed. The summary table reflects only those flies recorded as dead. The percentage mortality was calculated by dividing the number of dead flies from the total number of flies, with mortality at 48 hr analyzed by using Mann-Whitney test with mortality corrected for control values by using Abbott's Equation. LT_{50} and LT_{90} values were calculated by using Probit analysis.

Results

Exposure to 1.6 or 3.2 oz/1000 square foot A21741A fly bait (0.5% indoxacarb) at a.i. rates of Maryland and Georgia tests: 0.23 mg/cage indoxacarb or 0.45 mg/cage indoxacarb; California test: 0.5 mg/cage indoxacarb or 1.0 mg/cage indoxacarb caused ≥90% mortality within 48 hr at each test site (Table 1). Control mortality did not equal or exceed 10% during the test. The raw data agree with the summary table in the text within rounding errors.

Table 1.

	Time (hrs) to ≥90% mortality (or ≥10% mortality in control group)		
Location	Control	1.6 oz/1000 sq. ft	1.6 oz/1000 sq. ft
Baltimore	NO	48	48
Modesto	NO	48	48
Meansville	NO	48	48

NO = Not Observed

The lethal time to 90% mortality was 24.9 and 24.6 hr for the 1.6 and 3.2 oz/1000 square foot application rates, respectively in the Baltimore test, (Table 2 = Table 4 of MRID), 18.3 and 20.4 hr (Table 3 – Table 2 in MRID) in the Modesto test, and 2365.312 minutes (= 39.42 hr) for the 1.6 oz/1000 square foot rate in the Meansville test.

Table 2.

Table 4. Calculated LT50 and LT90 (in hours) for house flies exposed to two application rates of A21741A		
	LT50	LT90
1.6 OZ/1000ft^2	21.6	24.9
3.2 OZ/1000ft^2	21.5	24.6

Table 3.

Table 2. Lethal time (LT) values in hours for caged House flies, *Musca domestica*, exposed to two application rates of A21741A fly bait.

	Lethal Time - Hours	
Treatment	LT_{50} (95% Conf. Limits)	LT_{90} (95% Conf. Limits)
1. A21741A – 1.6 oz./1,000 ft^2	**8.1** (7.113 - 9.280)	**18.3** (15.241 - 23.055)
2. A21741A – 3.2 oz./1,000 ft^2	**8.6** (6.794 - 11.125)	**20.4** (15.183 - 31.779)

The authors report that the procedure in Meansville deviated from the protocol in that the cages were not randomized, the baits were placed in a pattern in the cages and not randomly throughout, and in the Baltimore test in that the minimum and maximum temperatures were not recorded on a min/max thermometer, but on a Hobo data logger.

Study 5. Zahn (2016). Indoxacarb: Evaluation of Indoxacarb Fly Bait for Control of Flies.

Purpose of study

The purpose of the study was to determine the effectiveness of indoxacarb bait formulations to house flies.

Materials and Methods

This test was conducted in Riverside, California on house flies (*Musca domestica*) field collected from a dairy near San Jacinto, California. Wild-caught flies were bred, and pupae of the F1 generation were maintained at 15.6 °C until sufficient numbers were obtained for the test. The pupae were placed into a 4 cubic foot cage supplied with 50: 50 powdered milk: sugar and a water source at 26.7 °C and 30% RH and allowed to emerge; they were kept at these conditions for four days. The authors do not report any determination of pesticide susceptibility status of the flies. One day prior to bait introduction, the flies were aspirated into five replicates of 50 mixed-sex flies each per treatment, which were then placed into 1 cubic foot cages with unlimited access to food and water. Three amounts of A21741A (0.046 = indoxacarb low rate, 0.091 = indoxacarb middle rate, and 0.182 = indoxacarb high rate g/square foot bait, indoxacarb a.i. percentage not reported), Zyrox (0.092 g/square foot bait, active ingredient identity and concentration not reported), QuikStrike (0.227 g/square foot bait, active ingredient identity and concentration not reported), an indoxacarb blank (0.091 g/square foot bait), or an empty dish (no-bait negative control) were evenly dispersed among four weigh boats and placed inside the cages, and the numbers of alive and dead (criteria not defined) flies were recorded at 10 and 30 min, and at 1, 3, 6, 24, 48, 72, and 96 hr. The test was conducted at 28.9 °C and 40% RH. The numbers of living flies reported in the results was based on subtracting the number of dead flies from the total, and there is no record of whether any moribund flies were handled as living or dead. The data were analyzed by using a Kaplan-Meir estimation for the survival curves, and LT_{50} and LT_{90} values were estimated by using logistic regression.

Results

Exposure of house flies to A21741A (0.046 = indoxacarb low rate, 0.091 = indoxacarb middle rate, and 0.182 = indoxacarb high rate g/square foot bait, indoxacarb a.i. percentage not reported), Zyrox (0.092 g/square foot bait, active ingredient identity and concentration not reported), and QuikStrike (0.227 g/square foot bait, active ingredient identity and concentration not reported) caused ≥90% mortality (survival not greater than 0.10) within 96 hr (Table 1 = Table 2 of MRID). Control mortality did not equal or surpass 10% during the test (survival not less than or equal to 0.90). Comparison of the raw data is based on the "total.dead" column rather than the "num.dead" column, and careful comparison of the two presentations of the raw data indicated the "total.dead" column was used by the author in the statistical analysis. Minor differences in the number of dead flies recorded between the raw data and the summary table were reported, but these differences (no more than 6 insects for any one treatment) only caused a difference in the second or third decimal place of the survival proportion and did not alter the conclusions reached.

Table 1.

Table 2: Total number of flies used and the total mortality of flies within each treatment.

Treatment	N	Total Mortality	Survival at 96 hrs.
Indoxacarb Blank	240	6	0.975
Empty Bait Dish	261	14	0.946
Indoxacarb Low Rate	246	235	0.045
Indoxacarb Medium Rate	247	244	0.012
Indoxacarb High Rate	239	234	0.021
Zyrox Low Rate	247	242	0.02
QuikStrike	246	238	0.0325

Exposure of house flies to A21741A (0.046 = indoxacarb low rate, 0.091 = indoxacarb middle rate, and 0.182 = indoxacarb high rate g/square foot bait, indoxacarb a.i. percentage not reported), Zyrox (0.092 g/square foot bait, active ingredient identity and concentration not reported), and QuikStrike (0.227 g/square foot bait, active ingredient identity and concentration not reported) caused 90% mortality at number of minutes estimated (LT_{90}) in Table 2 (= Table 4 of MRID).

Table 2.

Table 4: Predicted time until 50% and 90% mortality (LT_{50} and LT_{90}) for each treatment level. Neither the blank nor control resulted in sufficient mortality to estimate an LT_{50} or LT_{90} value. Slopes and standard errors presented are in log(Minutes).

Treatment	Slope (SE) log(Min)	LT_{50} (95% CI) (Min)*	LT_{90} (95% CI) (Min)*
Indoxacarb Blank	-0.2519 (0.1023)	INF	INF
No Bait (Control)	-0.09013 (0.05086)	INF	INF
Indoxacarb Low Rate	-1.56251 (0.06133)	616.05 (558.69, 679.31)	2513.78 (2184.34, 2892.90)
Indoxacarb Medium Rate	-1.59453 (0.06327)	516.44 (468.80, 568.93)	2048.64 (1777.32, 2361.38)
Indoxacarb High Rate	-1.83843 (0.07849)	502.32 (457.59, 551.42)	1659.72 (1446.44, 1904.45)
Zyrox Low Rate	-1.40135 (0.05367)	574.24 (518.66, 635.78)	2754.5 (2369.60, 3201.92)
QuikStrike	-0.99989 (0.03698)	339.96 (301.47, 383.37)	3060.38 (2519.22, 3717.78)

*All values for LT_{50} and LT_{90} were obtained using log transformation of the time axis (log(time+1) and have been back transformed.

The author did not report any amendments to or deviations from the protocol.

Study 6. Buczkowski (2016). Laboratory Evaluation of Indoxacarb Fly Bait against House Flies.

Purpose of study

The purpose of the study was to determine the efficacy of several rates of granular fly bait.

Materials and Methods

This study was conducted in West Lafayette, Indiana on larval house flies (*Musca domestica*) collected from a swine farm near West Lafayette and then reared to adulthood in laboratory conditions and provided 50: 50 powdered milk: sugar and water. The pesticide susceptibility of the collected colony was determined to not differ from that of a known susceptible colony purchased from Benzon Research Inc. by exposing five replicates of 20 adult mixed sex 2 to 3 day old house flies of each strain to 0.03 g of Zyrox fly bait (a.i. identity and concentration not reported) or indoxacarb fly bait (a.i. concentration not reported) (equivalent to 3.2 oz/1,000 square feet of bait) in an 8-inch diameter by 7 inches high (0.338 square foot) round test jar, followed by observation of fly mortality (criteria not defined) at 10 and 30 min, and at 1, 3, 6, and 24 hr exposure at 25 ± 2ºC and 50 ± 10% RH. For the feeding efficacy trial, five replications of 20 flies of the collected strain described above were released into the described jars, and four rates of A21741A (0.5% indoxacarb) were tested: 1.6 oz/1,000 square feet (0.015 g, 0.075 mg/jar indoxacarb), 3.2 oz/1,000 square feet (0.030 g, 0.15 mg/jar indoxacarb), 6.4 oz/1,000 sq ft (0.060 g, 0.30 mg/jar indoxacarb), and blank A21741A lacking indoxacarb. For positive control groups, Zyrox Fly Bait was applied at 3.2 oz/1,000 square feet (a.i. identity and concentration not reported) and Maxforce Fly Bait was applied at 5.7 oz/1,000 square feet (a.i. identity and concentration not reported). Fly mortality (criteria not defined) was determined at 10 and 30 min, and at 1, 3, 6, and 24 hr exposure. There is no indication of how moribund individuals, if noted, were treated as being included in mortality observations. The environmental conditions during the bait efficacy test were not reported, and the data were not statistically analyzed.

Results

Exposure of house flies to A21741A (0.5% indoxacarb) at 1.6 oz/1,000 square feet (0.015 g, 0.075 mg/jar indoxacarb), 3.2 oz/1,000 square feet (0.030 g, 0.15 mg/jar indoxacarb), 6.4 oz/1,000 sq ft (0.060 g, 0.30 mg/jar indoxacarb), and blank A21741A lacking indoxacarb or Zyrox Fly Bait applied at 3.2 oz/1,000 square feet (a.i. identity and concentration not reported) caused ≥90% mortality within 24 hr (Table 1 = Table 2 of MRID) and Maxforce Fly Bait applied at 5.7 oz/1,000 square feet (a.i. identity and concentration not reported) caused ≥90% mortality within 30 min. Control mortality did not equal or surpass 10% during the test. The raw data match the summary table.

Table 1. **Table. 2. Cumulative mean percent mortality (± st dev) in field-collected (Purdue) houseflies exposed to fly baits.**

treatment	rate	10 min	30 min	1 h	3 h	6 h	24 h
A21741A	blank	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 0	9 ± 7
A21741A	1.6 oz / 1000 sf	0 ± 0	0 ± 0	0 ± 0	22 ± 9	44 ± 19	100 ± 0
A21741A	3.2 oz / 1000 sf	0 ± 0	0 ± 0	0 ± 0	20 ± 15	41 ± 16	100 ± 0
A21741A	6.4 oz / 1000 sf	0 ± 0	0 ± 0	0 ± 0	16 ± 17	49 ± 18	100 ± 0
Zyrox Fly Bait	3.2 oz / 1000 sf	0 ± 0	0 ± 0	14 ± 8	58 ± 19	77 ± 14	100 ± 0
Maxforce Fly Bait	5.7 oz / 1000 sf	77 ± 10	100 ± 0	100 ± 0	100 ± 0	100 ± 0	100 ± 0

The author does not note any deviations from or amendments to the protocol.

Study 7. Snell (2017). Evaluation of Indoxacarb Fly Bait for Control of Flies.

Purpose of study

The purpose of the study was to compare different application rates of an indoxacarb granular fly bait.

Materials and Methods

This study was conducted in Meansville, Georgia on five replications of 25 insects per replicate 2 to 5-day old adult mixed sex house flies (*Musca domestica*) purchased from an unreported source. The pesticide susceptibility status of the insects was not reported. The test arenas consisted of 1 by 1-foot metal screen cages supplied with 60 mm petri dishes holding 50: 50 powdered milk: sugar for food. The flies were placed into the cages and allowed to acclimate for 24 hr before the introduction of the bait, with the specified amounts divided among four dishes placed randomly throughout the cage. The baits consisted of A21746 (blank) applied at 3.2 oz/1,000 square feet (0.09 g/cage, no active ingredient), A21741 applied at 1.6 oz/1,000 square feet (0.05 g/cage), A21741 applied at 3.2 oz/1,000 square feet (0.09 g/cage), A21741 applied at 6.4 oz/1,000 square feet (0.18 g/cage), Zyrox applied at 3.2 oz/1,000 square feet (0.09 g/cage), or QuickBayt (0.50% imidacloprid + 0.10% Z-9-tricosene) applied at 5.7 oz/1,000 square feet (0.16 g/cage, 0.8 mg/cage imidacloprid + 0.16 mg Z-9-tricosene). The total number of alive (exhibiting normal forward motion and able to fly), moribund (unable to remain upright but able to move any body part when probed), and dead (displaying no movement when probed) flies were recorded at 10 and 30 min, and at 1, 3, 6, 24, 48, 72, 96, and 120 hrs. It is not reported if moribund individuals were considered dead for the summary table and analysis. The test proceeded at 71 °F and 59% RH. Control and treatment effects were compared by using a one-tailed *t*-test at $p = 0.05$ and a two-tailed *t*-test at $p = 0.05$ was used to determine differences between test substances or rates.

Results

Exposure of house flies to A21741 applied at 1.6 oz/1,000 square feet (0.05 g/cage) caused ≥90% mortality within 120 hr; to A21741 applied at 3.2 oz/1,000 square feet (0.09 g/cage) within 96 hr; and to A21741 applied at 6.4 oz/1,000 square feet (0.18 g/cage) within 120 hr. Exposure of house flies to Zyrox applied at 3.2 oz/1,000 square feet (0.09 g/cage) or QuickBayt (0.50% imidacloprid + 0.10% Z-9-tricosene) applied at 5.7 oz/1,000 square feet (0.16 g/cage, 0.8 mg/cage imidacloprid + 0.16 mg Z-9-tricosene) did not cause ≥90% mortality within 120 hr. Control mortality, A21746 (blank) applied at 3.2 oz/1,000 square feet (0.09 g/cage, no active ingredient) did not cause ≥10% mortality within 120 hr (Table 1). The summary table matches the raw data.

Table 1.

House Fly											
% Mortality											
Test Substance:	Pre-trt	10 min	30 min	1 hr	3 hr	6 hr	24 hr	48 hr	72 hr	96 hr	120 hr
3.2oz/1,000sq ft. A21746A Blank IDX Fly Bait	0%	0%	0%	0%	0%	0%	0%	0%	2%	2%	3%
1.6oz/1,000sq ft. A21741A NOA445432 GR (0.5)	0%	0%	0%	0%	0%	1%	5%	21%	57%	82%	93%
3.2oz/1,000sq ft. A21741A NOA445432 GR (0.5)	0%	0%	0%	0%	0%	0%	2%	15%	68%	91%	95%
6.4oz/1,000sq ft. A21741A NOA445432 GR (0.5)	0%	0%	0%	0%	0%	1%	7%	29%	72%	87%	94%
3.2oz/1,000sq ft. A20780A Zyrox Fly Granular Bait	0%	0%	0%	0%	0%	0%	1%	9%	50%	62%	73%
5.7oz/1,000sq ft. QuickBayt® Fly Bait	0%	0%	0%	1%	0%	0%	2%	6%	16%	15%	18%

The authors do not report any amendments to or deviations from the protocol.

Study 8. Donahue (2017). Indoxacarb: Evaluation of Indoxacarb Fly Bait for Control of Flies.

Purpose of study

The purpose of the study was to compare the efficacy of three rates of indoxacarb fly baits against house flies.

Materials and Methods

This study was conducted in Modesto, California on five replications of approximately 100 per replication 2 to 7 day old mixed-sex adult house flies (*Musca domestica*) collected from a farm in Denair, California and reared in the laboratory. The authors do not report the pesticide susceptibility status of the insects. The flies were placed into 18 by 18 by 18-inch wire mesh cages with 2.25 square foot horizontal surface area, and contained a 12 by 12-inch paper towel, 8-oz water cup with wadded paper towel, and a container of dry milk: sugar diet and allowed to acclimate for 3 to 24 hr before bait introduction. The baits were introduced into each cage by placing equal amounts into each of five weigh boats that were then placed in the cages. The amounts, products, and active ingredients tested are shown in Table 1.

Table 1.

Product	Application rate (oz product/1000 square feet)	a.i. concentration	Amount applied/cage (g)	a.i. rate
A21746	3.2	(blank)	0.2	0 mg/cage
A21741	1.6	0.5 % indoxacarb	0.1	0.5 mg/cage indoxacarb
A21741	3.2	0.5 % indoxacarb	0.2	1.0 mg/cage indoxacarb
A21741	6.4	0.5 % indoxacarb	0.4	2.0 mg/cage indoxacarb
Zyrox	3.2	0.5% cyantraniliprole	0.2	1.0 mg/cage cyantraniliprole
QuikStrike	3.2	0.5% dinotefuran + 0.04% (z)-9-tricosene	0.2	1.0 mg/cage dinotefuran + 0.08 mg/cage (z)-9-tricosene

The number of alive (criteria not defined), moribund (abnormal reactions to stimuli) and dead (mortality, defined as "death or kill" of the flies) flies were recorded at 10 and 30 min, and at 1, 3, 6 24, 48, and 72 hr exposure. The authors do not report if moribund flies were treated as alive or dead in the summary tables. The test was conducted at 68.2 to 80.8 °F and 37 to 67% RH. Lethal time to 50 and 90% mortality (LT_{50} and LT_{90}) values were calculated by using probit analysis.

Results

Exposure of house flies to granular fly baits indicated in Table 2 caused ≥90% mortality within the number of hours indicated, and the LT_{90} values are presented. Exposure to blank bait did not cause ≥10% mortality within 96 hr.

Table 2.

Product	Application rate (oz product/1000 square feet)	a.i. concentration	Amount applied/cage (g)	a.i. rate	Time (hr) to ≥90% mortality	LT_{90} (hrs)
A21746	3.2	(blank)	0.2	0 mg/cage	NO	1,257,562.4
A21741	1.6	0.5 % indoxacarb	0.1	0.5 mg/cage indoxacarb	NO	100.5
A21741	3.2	0.5 % indoxacarb	0.2	1.0 mg/cage indoxacarb	96	71.7
A21741	6.4	0.5 % indoxacarb	0.4	2.0 mg/cage indoxacarb	96	68.3

Zyrox	3.2	0.5% cyantraniliprole	0.2	1.0 mg/cage cyantraniliprole	NO	352.2
QuikStrike	3.2	0.5% dinotefuran + 0.04% (z)-9-tricosene	0.2	1.0 mg/cage dinotefuran + 0.08 mg/cage (z)-9-tricosene	NO	189,794.7

The summary table does not match the hand-written raw data due to an error in which replications 4 and 5 of QuikStrike and Zyrox were switched when the hand-written record was transcribed to the tables used to generate the summary table provided in the MRID. The correct data for Zyrox and QuikStrike are presented in Table 3.

Table 3.

		Hours exposure								
		10 min	30 min	1	3	6	24	48	72	96
Zyrox	% dead	0.0	0.0	0.0	0.0	0.0	2.6	9.3	18.7	24.9
QuikStrike	% dead	0.0	0.0	0.0	0.0	0.0	3.3	8.7	17.3	33.7

The authors do not report any deviations from or amendments to the protocol.

Study 9. Buczkowski (2016). Indoxacarb: Control of House Flies under Field Conditions Following Baiting.

Purpose of study

The purpose of the study was to determine the speed of population reduction of flies in response of baiting.

Materials and Methods

This test was conducted in West Lafayette, Indiana on four replications of one hundred (100) 2 to 4-day old adult mixed sex field collected Purdue strain house flies (*Musca domestica*) released into a 10 by 8 by 7-foot test kitchen (80 square foot floor area) maintained at 79ºF (range 72 to 81 ºF) and 27% humidity (range 22 to 33%) in which a food (50: 50 powdered milk: sugar) and water were provided. Several granular bait formulations were tested: 7.2 g of A21746A (blank) at 3.2 oz/1000 square feet, 3.6 g of A21741A (0.5% indoxacarb; 18.0 mg/kitchen indoxacarb) at 1.6 oz/1000 square feet, 7.2 g of A21741A (0.5% indoxacarb; 36.0 mg/kitchen indoxacarb) at 3.2 oz/1000 square feet, 14.4 g of A21741A (0.5% indoxacarb; 72.0 mg/kitchen indoxacarb) at 6.4 oz/1000 square feet, 7.2 g of Zyrox Fly Bait (0.5% cyantraniliprole; 36.0 mg/kitchen cyantraniliprole) at 3.2 oz/1000 square feet, and 13.0 g Maxforce Fly Bait (0.6% imidacloprid; 78.0 mg/kitchen imidacloprid) at 5.7 oz/1000 square feet. The bait was within shallow plastic trays set on the floor in the center of the kitchen. Fly mortality (criteria not identified) was examined at 10 and 30 minutes, and then at 1, 3, 6, 24, and 48 hours. The author does not note if moribund flies were recorded, or if so how they were handled in the evaluations of the data. The data were not statistically analyzed.

Results

Exposure of house flies to 3.6 g of A21741A (0.5% indoxacarb; 18.0 mg/kitchen indoxacarb) at 1.6 oz/1000 square feet, 7.2 g of A21741A (0.5% indoxacarb; 36.0 mg/kitchen indoxacarb) at 3.2 oz/1000 square feet, and 14.4 g of A21741A (0.5% indoxacarb; 72.0 mg/kitchen indoxacarb) at 6.4 oz/1000 square feet caused ≥90% mortality within 48 hr, while exposure of house flies to 7.2 g of Zyrox Fly Bait (0.5% cyantraniliprole; 36.0 mg/kitchen cyantraniliprole) at 3.2 oz/1000 square feet, and 13.0 g Maxforce Fly Bait (0.6% imidacloprid; 78.0 mg/kitchen imidacloprid) at 5.7 oz/1000 square feet caused ≥90% mortality within 24 hr (Table 1). Mortality in the 7.2 g of A21746A (blank) at 3.2 oz/1000 square feet control group did not equal or surpass 10% within 48 hr. The raw data provided matches the summary table.

Table 1.

Table 1. The mean percentage mortality (± st dev) in houseflies exposed to fly baits in experimental kitchens.

treatment	rate	10 min	30 min	1 h	3 h	6 h	24 h	48 h
A21746A (blank)	3.2 oz / 1000 sf	0 ± 0	0 ± 0	0 ± 0	0 ± 0	0 ± 1	4 ± 2	7 ± 2
A21741A	1.6 oz / 1000 sf	0 ± 0	4 ± 3	11 ± 4	20 ± 6	44 ± 10	80 ± 11	100 ± 0
A21741A	3.2 oz / 1000 sf	2 ± 2	7 ± 3	15 ± 5	21 ± 5	42 ± 5	65 ± 8	100 ± 0
A21741A	6.4 oz / 1000 sf	0 ± 0	8 ± 4	16 ± 5	26 ± 7	49 ± 8	67 ± 13	100 ± 0
Zyrox Fly Bait	3.2 oz / 1000 sf	4 ± 4	9 ± 3	25 ± 6	45 ± 9	65 ± 9	93 ± 5	100 ± 0
Maxforce Fly Bait	5.7 oz / 1000 sf	2 ± 2	11 ± 3	25 ± 9	39 ± 11	56 ± 18	95 ± 4	100 ± 0

The author does not note any deviations from or amendments to the protocol.

Study 10. Lee (2016). Indoxacarb: Evaluation of Indoxacarb Fly Bait for Control of Flies.

Purpose of study

The purpose of the study was to compare efficacy against house flies of three rates of an indoxacarb granular bait formulation.

Materials and Methods

This study was conducted in Las Cruces, New Mexico on five replications of 250 per replication of a field collected and reared to the F1 generation population of 2 to 3-day old adult mixed sex house flies (Musca domestica) having had previous exposure to pyrethroid and imidacloprid baits. The flies were released into 10 by 10 by 7-foot screen tents (100 square feet floor space) containing a source of water and 1: 1 sugar; powdered milk food source. Six bait treatments (none of the active ingredient identities or concentrations were reported) were placed inside the screen tents: 9.07 g of A21746 at 3.2 oz/1000 square feet, 4.54 g of A21741 at 1.6 oz/1000 square feet, 9.07 g of A21741 at 3.2 oz/1000 square feet, 18.14 g of A21741 at 6.4 oz/1000 square feet, 9.07 g of Zyrox Fly Granular Bait at 3.2 oz/1000 square feet, and 22.7 g of QuikStrike Fly Bait at 4 oz/500 square feet. The total number of alive, moribund, and dead flies (criteria not reported) were recorded at 10 and 30 minutes, and at 1, 3, 6, 24, 48, and 72 hrs. Moribund flies were not included in the number of dead in the summary table. The test was conducted at 67.05 to 105.93 °F and 10.15 to 68.91% RH. Significant effects were determined by using analysis of variance (ANOVA) and Tukey's HSD all-pairwise comparisons test at $P < 0.05$.

Results

Exposure to 4.54 g of A21741 at 1.6 oz/1000 square feet, 9.07 g of A21741 at 3.2 oz/1000 square feet, 18.14 g of A21741 at 6.4 oz/1000 square feet, 9.07 g of Zyrox Fly Granular Bait at 3.2 oz/1000 square feet, and 22.7 g of QuikStrike Fly Bait at 4 oz/500 square feet caused ≥90% mortality to house flies within 24 hr (Table 1 = Table 3 of MRID). Mortality in the indoxacarb blank did not equal or surpass 10% during the test. The raw data differed from the summary table for QuikStrike at 24 hr; the raw data indicate an average mortality of 98.88% rather than 99.48%.

Table 1.

Table 3. Mean[1] percent mortality (Uncorrected) of house flies (*Musca domestica)* following exposure to A21741 Indoxacarb Fly Bait applied in a scatter method. Treatment Date: 7 July, 2016. Entomology Consultants LLC.

	MEAN[1] PERCENT MORTALITY (UNCORRECTED)							
TREATMENT	0.5 HAT	1 HAT	3 HAT	6 HAT	24 HAT	48 HAT	72 HAT	96 HAT
A21746 @ 3.2 oz/ 1000 FT[2]	0.00 b[2]	0.00 b	0.00 b	0.00 c	0.56 c	2.56 c	2.57 b	2.57 b
A21741 @ 1.6 oz/ 1000 FT[2]	0.00 b	0.00 b	0.00 b	0.00 c	90.8 b	94.24 b	97.44 a	97.44 a
A21741 @ 3.2 oz/ 1000 FT[2]	0.00 b	0.00 b	0.00 b	0.00 c	98.4 a	98.4 a	99.52 a	100 a
A21741 6.4 oz/ 1000 FT[2]	0.00 b	0.00 b	0.00 b	0.00 c	99.04 a	99.52 a	100 a	100 a
Zyrox Fly Granular @ 3.2 oz/1000 FT[2]	0.00 b	0.00 b	3.44 b	17.12 b	98.4 a	98.88 a	99.68 a	100 a
QuikStrike Fly Bait @ 4 oz/ 500FT[2]	13.28 a	26.4 a	48.4 a	65.92 a	99.48 a	99.6 a	99.76 a	99.76 a
F_Value	13.69	140.52	104.94	63.61	1784.08	2009.54	4676.82	5056.03
Pr>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

1. Mean based upon 250 flies per treatment x 5 replications.
2. Means followed by the same letter are not significantly different using analysis of variance (ANOVA) and Tukey's HSD All-pairwise Comparisons Test. (P≤ 0.05)

The author does not report any amendments to or deviations from the protocol.

Study 11. Buczkowski (2015). Indoxacarb: Control of House Fly Following Application of Scatter vs Placement in Bait Stations.

Purpose of study

The purpose of the study was to determine the efficacy of indoxacarb baits in scatter and bait station applications against house flies.

Materials and Methods

This test was conducted in West Lafayette, Indiana, on five replications of 100 each 2 to 4-day old mixed sex house fly (*Musca domestica*) adults released into 8 by 10 by 7-foot 980 square foot floor area) artificial test kitchens provided with water sources and 50: 50 mixtures of powdered milk: sugar for food. The source and pesticide susceptibility status of the house flies was not reported. Seven bait treatments were tested: 7.4 g/kitchen Zyrox Fly Bait (A20780A, 0.5% cyantraniliprole, 37.0 mg/kitchen cyantraniliprole) at a rate of 3.2 oz/1000 square feet applied as a scatter by placing in a weigh boat, the same amount of Zyrox applied in an FBS bait station (37.0 mg/kitchen cyantraniliprole), 7.4 g/kitchen indoxacarb fly bait (A21741A, 0.5% indoxacarb, 37.0 mg/kitchen indoxacarb) at a rate of 3.2 oz/1000 square feet applied as scatter, the same amount of A21741A applied in an FBS bait station (37.0 mg/kitchen indoxacarb), an unreported amount of blank bait (A21746A INDX) applied as scatter, an unreported amount of blank bait (A21746A INDX) applied in FBS station, and an unreported amount of Maxforce Fly Bait (0.5% imidacloprid) applied in an FBS station. Fly mortality (criteria not defined) was recorded at 1, 2, 4, 8, 24, 48, and 72 hours. There is no indication if moribund individuals were observed, or if so how they were handled in the data analysis. The test was conducted at 79 ºF (72 to 81 ºF) and 27% RH (22 to 33%). The data were not statistically analyzed.

Results

Exposure of house flies to 7.4 g/kitchen Zyrox Fly Bait (A20780A, 0.5% cyantraniliprole, 37.0 mg/kitchen cyantraniliprole) at a rate of 3.2 oz/1000 square feet applied as a scatter caused ≥90% mortality within 24 hr, the same amount of Zyrox applied in an FBS bait station (37.0 mg/kitchen cyantraniliprole) caused ≥90% mortality within 72 hr, 7.4 g/kitchen indoxacarb fly bait (A21741A, 0.5% indoxacarb, 37.0 mg/kitchen indoxacarb) at a rate of 3.2 oz/1000 square feet applied as scatter caused ≥90% mortality within 48 hr, the same amount of A21741A applied in an FBS bait station (37.0 mg/kitchen indoxacarb) did not cause ≥90% mortality within 72 hr, an unreported amount of blank bait (A21746A INDX) applied as scatter caused ≥10% mortality within 72 hr, an unreported amount of blank bait (A21746A INDX) applied in FBS station caused ≥10% mortality within 72 hr, and an unreported amount of Maxforce Fly Bait (0.5% imidacloprid) applied in an FBS station caused ≥90% mortality within 72 hr (Table 1). The raw data provided matches the summary table.

Table 1.

Table 1. The mean percentage mortality (± st dev) in houseflies exposed to fly baits in simulated kitchens.

treatment	1 h	2 h	4 h	8 h	24 h	48 h	72 h
Zyrox - scatter	30 ± 6	46 ± 10	61 ± 12	79 ± 9	100 ± 0	100 ± 0	100 ± 0
Zyrox - FBS	0 ± 0	0 ± 0	2 ± 3	23 ± 6	47 ± 12	73 ± 9	100 ± 0
Indox - scatter	6 ± 6	13 ± 7	19 ± 7	36 ± 9	63 ± 16	100 ± 0	100 ± 0
Indox - FBS	0 ± 0	0 ± 0	0 ± 0	7 ± 7	28 ± 7	54 ± 14	88 ± 12
Blank - scatter	0 ± 0	0 ± 0	0 ± 0	1 ± 1	4 ± 3	8 ± 3	10 ± 3
Blank - FBS	0 ± 0	0 ± 0	0 ± 0	1 ± 1	4 ± 3	7 ± 2	12 ± 4
Maxforce - FBS	0 ± 0	3 ± 3	11 ± 5	22 ± 8	61 ± 12	85 ± 7	100 ± 0

The author does not report any deviations from or amendments to the protocol, although the protocol mentions four replications while the raw data report five replications.

Study 12. Lee (2015). Indoxacarb: Evaluation of Indoxacarb Fly Bait for Control of Flies.

Purpose of study

The purpose of the study was to evaluate the efficacy of indoxacarb fly baits in scatter and bait station distribution.

Materials and Methods

This study was conducted in Las Cruces, New Mexico on five replications of 200 per replication 2 to 3-day old mixed-sex laboratory reared house flies (*Musca domestica*) (pesticide susceptibility status and rearing conditions not reported). Test cages were 3 by 3 by 4 ft screen cages (9 square feet floor area) supplied with water and 1: 1 powdered milk: sugar. All baits (A21746 (blank), A21741, and Zyrox) except Maxforce were applied in the same amounts per cage (all treatments 816.46 mg/cage to simulate a 3.2 oz/1000 square feet application rate) as either a scatter application or inside fly bait stations. Maxforce (1530.87 mg, to simulate a 6.0 oz/1000 square feet application rate) was only tested in bait station application. The active ingredient identities and concentrations for all baits were not reported. The flies were released into the cages at a maximum 32.2 ºC (± 3º) and minimum 21 ºC (±2º) at 40% RH and photoperiod of 12L: 12D. The total number of moribund and dead (neither criteria defined) flies were counted at 0.5, 1, 3, 6, 24, 48, 72, 96, and 168 hr. The percentage mortality in the summary table is based only on dead flies. The data were analyzed by using analysis of variance (ANOVA) and Tukey's HSD All-pairwise Comparisons Test at $P< 0.05$.

Results

Exposure of house flies to A21746 fly bait (blank) as scatter or in bait stations did not cause ≥10% mortality within 168 hr. Exposure of house flies to A21741 bait caused ≥90% mortality within 24 hr as a scatter application and within 48 hr in bait stations. Exposure of house flies to Zyrox bait caused ≥90% mortality within 24 hr as a scatter application but did not cause ≥90% mortality within 168 hr in bait station applications. Exposure of house flies to Maxforce Flay Bait in bait stations did not cause ≥90% mortality within 168 hr (Table 1 = Table 3 of MRID). The summary table matches the raw data.

Table 1.

Table 3. Mean[1] percent mortality (Uncorrected) of house flies (*Musca domestica)* following exposure to A21741 Indoxacarb Fly Bait applied in a scatter and Fly Bait Station (FBS) method. Treatment Date: 22 November, 2015. Entomology Consultants LLC.

	MEAN[1] PERCENT MORTALITY (UNCORRECTED)								
TREATMENT	0.5 HAT	1 HAT	3 HAT	6 HAT	24 HAT	48 HAT	72 HAT	96 HAT	168 HAT
A21746 Scatter	0%a[2]	0%b	0%b	0%c	0.2%d	0.2% c	2.7%c	4.6%c	5.1%c
A21746 FBS	0%a	0%b	0%b	0%c	0%d	0%c	1.2%c	4.7%c	6.4%c
A21741 Scatter	0%a	0%b	0%b	0%c	96.3%a	99.8%a	100%a	100%a	100%a
A21741 FBS	0%a	0%b	0%b	0%c	87.2%b	98.5%a	100%a	100%a	100%a
Zyrox Fly Granular Scatter	0%a	0%b	0.3%b	9.4%b	97.8%a	100%a	100%a	100%a	100%a
Zyrox Fly Granular FBS	0%a	0%b	0.1%b	0.9%c	73.9%c	82.6%b	82.6%b	83.5%b	83.5%b
MaxForce Fly Bait FBS	0.9%a	4.2%a	13.6%a	40.4%a	72.5%c	82.1%b	83.7%b	83.7%b	84.7%b
F_Value	2.61	9.46	39.59	128.45	651.03	658.32	923.00	843.39	956.63
Pr>F	0.0430	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

1. Mean based upon 200 flies per treatment x 5 replications.
2. Means followed by the same letter are not significantly different using analysis of variance (ANOVA) and Tukey's HSD All-pairwise Comparisons Test. (P≤ 0.05)

The author does not report any deviations from or amendments to the protocol.

Study 13. Buczkowski (2017). Field Evaluation of Indoxacarb Fly Bait against the House Fly Musca Domestica in a Commercial Swine Facility.

Purpose of study

The purpose of the study was to evaluate the efficacy of an indoxacarb house fly bait product in a swine production facility.

Materials and Methods

This study was conducted in West Lafayette, Indiana in five swine barns, ranging from 84 to 174 square meter floor area each. The initial natural field population of house fly (*Musca domestica*) was estimated by using sticky traps at one ribbon per 19 square meters (4 to 9 per building) for 24 hr at three daily intervals before any baits were placed. Indoxacarb Fly Bait (0.5% indoxacarb) was dispensed using Apache Fly Bait Stations to approximate a rate of 6.4 oz/1000 square feet by using 195 g/100 square meters at an a.i. rate of 0.975 g/100 square meters indoxacarb. The efficacy of the treatments was evaluated at 1 day and at 1, 2, and 3 weeks following bait introduction by counting the number of flies in the sticky ribbons deployed as described above, and calculating the percentage reduction in trapped fly numbers as a function of initial fly counts. Because mortality and morbidity were not end points in this study, a distinction between the two and description of data handling was not relevant. The author did not report fly trapping in any un-baited buildings as a negative control comparison. Environmental data were not presented. The data were not statistically analyzed.

Results

Baiting with Indoxacarb Fly Bait (0.5% indoxacarb) dispensed at a rate of 6.4 oz/1000 square feet at an a.i. rate of 0.975 g/100 square meters indoxacarb caused ≥90% reduction in house flies recovered in sticky traps relative to initial counts within 2 weeks (Table 1 = Table 2 of MRID). There was no negative control. The numbers highlighted in yellow in the summary table do not match the raw data. The number trapped for Growing and Finishing III at 1 DAT should be 92, and the percentage should be -91, -96, -84, and -93% for Farrowing and Nursery I, Breeding and Gestation II, Growing and finishing III, and MEAN (all buildings), respectively.

Table 1.

Table 2. Mean house fly counts (± st dev) in buildings treated with Indoxacarb Fly Bait. Mean percent reduction is in parentheses.

building	initial	1 DAT	1 WAT	2 WAT	3 WAT
Farrowing and Nursery I	186 ± 38	193 ± 52 (+12%)	40 ± 29 (-77%)	20 ± 13 (-89%)	15 ± 14 (-93%)
Breeding and Gestation II	85 ± 47	67 ± 50 (-28%)	7 ± 7 (-93%)	2 ± 3 (-99%)	4 ± 6 (-95%)
Growing and Finishing III	116 ± 43	94 ± 46 (-19%)	30 ± 23 (-75%)	20 ± 13 (-84%)	20 ± 11 (-78%)
Farrowing and Nursery II	17 ± 5	9 ± 5 (-44%)	0 ± 0 (-100%)	0 ± 0 (-100%)	0 ± 0 (-100%)
Swine Evaluation	79 ± 43	64 ± 32 (-8%)	2 ± 5 (-98%)	3 ± 4 (-96%)	3 ± 4 (-95%)
MEAN (all buildings)	**97 ± 62**	**85 ± 67 (-17%)**	**16 ± 18 (-88%)**	**9 ± 10 (-93%)**	**8 ± 8 (-92%)**

The author does not report any deviations from or amendments to the protocol.

Study 14. Parker (2017). Thirty m^3 Simulated use Test to Evaluate the Efficacy of Fly Bait Formulations against Houseflies, *Musca Domestica*.

Purpose of study

The purpose of the study was to assess the efficacy of fly bait formulations against house flies.

Materials and Methods

This study was conducted in Cardiff, UK, on a species of relevance in the United States. Groups of one hundred (100 target; actual: 75 to 96) 3 to 6-day old mixed-sex (50: 50) insecticide-susceptible house flies (*Musca domestica*) from a laboratory stock colony (rearing conditions were not reported) were released in three replications into 30-cubic meter test chambers supplied with a water source and granulated sugar at least 1 hr prior to the introduction of the bait. Unreported amounts of A21741A (0.5% indoxacarb), Zyrox Fly Granular Bait (0.5% cyantraniliprole) or Agita 1GB (1.0% thiamethoxam) were placed into the test chambers (granulated sugar used as a negative control) in Apache Fly Bait Stations and the number of flies knocked down (insect unable to upright itself or perform coordinated directional movement) after 1, 2 and 4 hr, dead (insect displaying no response to tactile stimulus, including any observation of twitching or moving any appendage) at 24, 48, 72 and 96 hr or healthy (insect remains unaffected and capable of coordinated movement away from a stimulus) was determined. There is no indication if a "moribund" condition was observed, or if specimens fitting a moribund definition were classed as dead or knocked down in the data collection. The test was conducted at 24.5 to 27.5 °C and 27.8 to 80.3% RH. The data were not statistically analyzed.

Results

Exposure of house flies to Agita 1GB (1.0% thiamethoxam) and Zyrox (0.5% cyantraniliprole) caused ≥90% mortality within 24 hr, while exposure to A21741A (0.5% indoxacarb) caused ≥90% mortality within 48 hr (Table 1 = Table 2 of MRID). Control mortality did not equal or surpass 10% within 96 hr. The summary table differs from the raw data for Zyrox at 24 hr, which should read 93.0%.

Table 1.

Table 2. Percentage mean dead houseflies exposed to fly bait formulations between the 24 hour and 96 hour experimental period (± standard error, n=3)

Time post fly introduction	Zyrox fly bait	Indoxacarb 0.5%	Agita 1GB	Untreated control
24 hours	91.8	76.6	95.0	1.0
	± 5.3	± 10.8	± 3.9	± 0.6
48 hours	99.3	97.9	100.0	3.0
	± 0.7	± 2.1	± 0.0	± 1.0
72 hours	99.7	99.6	100.0	4.3
	± 0.3	± 0.4	± 0.0	± 0.9
96 hours	100.0	99.6	100.0	6.0
	± 0.0	± 0.4	± 0.0	± 1.5

The author does not report any amendments to or deviations from the protocol.

Study 15. Miller & Peters (2017). Semi-field Evaluation of Syngenta and Competitor Granular and Paint-On Fly Baits against Houseflies.

Purpose of study

The purpose of the study was to evaluate the efficacy of indoxacarb bait formulations applied as granular and paint-on treatments.

Materials and Methods

This study was conducted in Canterbury, New South Wales, Australia on a species of relevance in the United States. Screened pavilions 3 by 6 by 3.5 m (18 square meter floor area) were constructed in an outdoor area and supplied with two containers of granulated sugar and two containers of wetted tissue. Granular fly baits were tested at the rates indicated for granular or paint-on treatment as indicated in Table 1 by dividing the total mass equally among four plates and placing in the pavilions.

Table 1.

Bait	a.i. concentration	Granular Application rate (g/pavilion)	Granular a.i. rate (mg/pavilion)	Paint on mix rate (g/pavilion)	Paint on a.i. rate (mg/pavilion)
A21741A	0.5% indoxacarb	36	180	50	250
A21741A	0.5% indoxacarb	18	90.0	25	125
Zyrox	0.5% cyantraniliprole	36	180	50	250
QuickBayt	5.0% imidacloprid + 1.0% (Z)-9-tricosene	36	1800 + 360	50	2500 + 500

For the paint-on formulations, the amount of granules specified in Table 1 were dissolved in water then painted onto four 30 by 30-cm cardboard pieces, which were hung in each pavilion. The negative control group consisted of pavilions supplied with food and water but no bait treatments. The study was replicated four times. On the day of testing, 200 mixed-sex adult 2 to 6-day old house flies (*Musca domestica*) CERIT strain obtained from Westmead Hospital in Sydney, Australia were released into the screened pavilions. The test was conducted at ambient outdoor conditions, 14.8 to 36.4 °C and 35 to 79% RH. Knockdown (fly on its back and unable to right itself) was assessed 15, 30, 60, 120, 180, and 240 min, and mortality (insect displays no observable movement for 3 seconds) was assessed at 24 hr following bait introduction. Data were analyzed by using one-factorial analysis of variance via the general linear model, and the assumption of normal distribution was checked by using P-P plot and homogeneity of variance using Levene's test of equality of error variances.

Results

Exposure of house flies to granular or paint-on bait treatments listed in Table 2 and 3 did not cause ≥90% knockdown within 240 minutes. Control mortality did not equal or surpass 10% within 240 minutes. The summary table presented in Table 2 agrees with the raw data to within rounding errors, while in Table 3 the numbers in parentheses indicate the value as calculated from the raw data. All other data agree within rounding error.

Table 2.

				Minutes exposure					
Bait	a.i. concentration	Granular	Granular a.i. rate (mg/pavilion)	15	30	60	120	180	240

		Application rate (g/pavilion)							
A21741A	0.5% indoxacarb	36	180	0.3	0.5	2.6	9.2	19.9	31.3
A21741A	0.5% indoxacarb	18	90.0	0.8	1.7	5.1	12.7	21.2	32.5
Zyrox	0.5% cyantraniliprole	36	180	2.5	7.3	13.3	20.9	33.0	43.0
QuickBayt	5.0% imidacloprid + 1.0% (Z)-9-tricosene	36	1800 + 360	2.4	6.2	11.6	17.9	30.8	39.7
Control				0	0	0	0.2	0.5	0.9

Table 3.

				Minutes exposure					
Bait	a.i. concentration	Paint-On Application rate (g/pavilion)	Paint-On a.i. rate (mg/pavilion)	15	30	60	120	180	240
A21741A	0.5% indoxacarb	50	250	1.3	3.8	6.9	19.6	35.2	44.5
A21741A	0.5% indoxacarb	25	125	1.4 (0.5)	3.9	6.2	21.6	35.1	47.5
Zyrox	0.5% cyantraniliprole	50	250	5.2 (4.6)	15.9	25.8	42.9 (41.8)	53.2	62.4
QuickBayt	5.0% imidacloprid + 1.0% (Z)-9-tricosene	50	2500 + 500	13.1 (14.6)	27.9	37.3	47.2	56.1	67.2
Control				0.3	1.1	1.3	1.8	2.0	2.9

Exposure of house flies to granular A21741A at 180 mg/pavilion indoxacarb 4 caused ≥90% mortality within 24 hr, and exposure to paint-on formulations of A21741A at 180 mg/pavilion indoxacarb, A21741A at 90.0 mg/pavilion indoxacarb and Zyrox at 180 mg/pavilion cyantraniliprole caused ≥90% mortality within 24 hr (Table 4). Control mortality did not equal or surpass 10% within 24 hr. The summary table matches the raw data to within rounding errors.

Table 4.

Bait	a.i. concentration	Granular Application rate (g/pavilion)	Granular a.i. rate (mg/pavilion)	Granular % mortality at 24 hr	Paint on mix rate (g/pavilion)	Paint on a.i. rate (mg/pavilion)	Paint-On % mortality at 24 hr
A21741A	0.5% indoxacarb	36	180	91.7	50	250	95.5
A21741A	0.5% indoxacarb	18	90.0	89.9	25	125	94.6
Zyrox	0.5% cyantraniliprole	36	180	88.3	50	250	94.2
QuickBayt	5.0% imidacloprid + 1.0% (Z)-9-tricosene	36	1800 + 360	80.7	50	2500 + 500	87.2
Control				3.2			6.0

The authors do not report any deviations from or amendments to the protocol.

Study 16. Snell (2017). Evaluation of Zyrox Fly Granular Bait and Paint-On and Scatter Bait Application against House Flies.

Purpose of study

The purpose of the study was to determine the efficacy of granular and paint-on applications of Zyrox fly baits.

Materials and Methods

This study was conducted in Meansville, Georgia on five replications of a laboratory strain of twenty (20) per replicate 2 to 5-day old adult mixed-sex house flies (*Musca domestica*) purchased from an unreported source (rearing conditions and pesticide susceptibility status were not reported). All tests took place in 1 by 1 by 1 foot screen cages (6 square foot surface area) supplied with 10% sucrose cotton swabs as a source of food and water. Zyrox Fly Granular Bait (active ingredient identity and concentration not reported in this study) was applied either as a granular scatter application by applying 3.2oz/1,000 square feet (0.0032oz/cage) in a thin layer in a 60 mm plastic Petri dish, or in a paint-on application by dissolving 0.59 g Zyrox in 1.227, 0.614, or 0.413 ml water to form a paste that was painted onto 10 by 10-cm cardboard squares for the 48, 96 and 144 gpr/100 ml treatments, respectively [Note: this method results in the same amount of active ingredient delivered to the same surface area of the cardboard squares and therefore the same amount to each cage. Therefore, all paint-on treatments tested equivalent doses and rates]. Untreated control replicates consisted of cages handled as were the treatment groups, but receiving no baits. The test was conducted at 72 °F and 48% RH. The number of alive, moribund, and dead (criteria not defined) flies in each cage was recorded at 1, 6, 24, 48, 72, and 96 hr. The mortality data presented are based only on those flies recorded as "dead" in the raw data. The data were analyzed by using a *t*-test with a probability $P \leq 0.05$.

Results

Exposure of house flies to Zyrox paint-on treatments resulted in ≥90% mortality within 96 hr for the 48gpr/100 ml treatment, and within 48 hr for the 96gpr/100 ml, 144gpr/100ml, and Zyrox scatter bait treatments (Table 1). Control mortality did not equal or surpass 10% within 96 hr. The summary table matches the raw data, with the exception that the 24 hr observation for 96gpr was 72% rather than the 71% reported, and 144gpr at 24 hr is 67% instead of 66%.

Table 1.
Table 1.

% Mortality of House Flies							
Test Substance:	**Pre-trt**	**1 hr**	**6 hr**	**24 hr**	**48 hr**	**72 hr**	**96 hr**
Controls - Untreated	0%	0%	0%	1%	3%	4%	5%
48gpr/100ml Zyrox Paint-On	0%	0%	1%	63%	87%	89%	91%
96gpr/100ml Zyrox Paint-On	0%	0%	2%	71%	97%	98%	99%
144gpr/100ml Zyrox Paint-On	0%	0%	1%	66%	92%	96%	99%
Zyrox Scatter Bait	0%	0%	0%	69%	97%	100%	100%

The authors do not report any deviations from or amendments to the protocol.

Study 17. Buczkowski (2017). Laboratory Evaluation of Zyrox Granular Fly Bait as a Potential Paint-On Application against House Flies.

Purpose of study

The purpose of the study was to determine the efficacy of Zyrox Fly Bait as a paint-on formulation against house flies.

Materials and Methods

This test was conducted in West Lafayette, Indiana on five replicates of 20 per replicate 2 to 3-day old mixed-sex adult house flies (*Musca domestica*) from an unreported source reared by using unreported methods and of an unreported pesticide susceptibility status. The flies were released into 1 by 1 by 1-foot cages containing a water-soaked cotton ball and 5 g of a 5: 5 mixture of powdered milk: sugar at 25 ± 2 ºC and 50 ± 10% RH. Zyrox Fly Bait and Maxforce Fly Bait (active ingredient identities and concentrations were not reported in this study) were tested as granular and paint-on applications, or water-only control, by scattering 0.18 g/cage Zyrox or Maxforce to the bottom of the cage, by applying 12.6 g Zyrox to a sticky card, or by dissolving 0.5, 1.0, or 1.5 g Zyrox into 1 oz water, by dissolving 0.18 g Zyrox in 2 ml water, or by dissolving 1.5 oz Maxforce in 1 oz water. The resulting paint-on solutions were applied (2 ml) to 6 by 6-inch glazed ceramic kitchen tile, 6 by 6-inch untreated pine board, or was absorbed by a 6 by 0.25-inch diameter braided cotton cord before all treatments were allowed to dry overnight [Note: not all treatments were tested on all surfaces, as indicated in Table 1 of the MRID]. Fly mortality (criteria not defined) was assessed at 2, 4, 6, 8 and 24 hr exposure. There is no report if any moribund individuals were noted, or if so, if they were treated as dead in the data analysis. The data were not statistically analyzed.

Results

Exposure to the Zyrox and Maxforce treatments caused ≥90% mortality within the number of hours indicated in Table 1. Control mortality did not equal or exceed 10% within 96 hr. The raw data matches the summary table.

Table 1.

Product	Rate	Surface	Hr to ≥90% mortality
Zyrox granular	6.4 oz/1000 sq ft	Cage bottom	4
Zyrox paint-on	0.5 oz bait: 1 oz water	Tile	2
Zyrox paint-on	0.5 oz bait: 1 oz water	Wood	2
Zyrox paint-on	1.0 oz bait: 1oz water	Cord	4
Zyrox paint-on	1.0 oz bait: 1oz water	Tile	2
Zyrox paint-on	1.0 oz bait: 1oz water	Wood	2
Zyrox paint-on	1.5 oz bait: 1oz water	Cord	4
Zyrox paint-on	1.5 oz bait: 1oz water	Tile	4
Zyrox paint-on	1.5 oz bait: 1oz water	Wood	2
Zyrox granular	0.4 oz bait per card	Sticky card	4
Maxforce paint-on	1.5 oz bait: 1oz water	Cord	2
Maxforce paint-on	1.5 oz bait: 1oz water	Tile	2
Maxforce paint-on	1.5 oz bait: 1oz water	Wood	2
Maxforce granular	6.3 oz/1000 sq ft	Cage bottom	2

The author does not report any deviations from or amendments to the protocol.

Conclusions

- Exposure to 0.09g/cage of fresh A21740A (NCA445432 GR (0.2)), A21741A (NCA445432 GR (0.5)), and A20780A (Zyrox Granular Fly Bait) caused ≥90% mortality within 72, 72 and 96 hr, respectively, and exposure to aged A21740A (NCA445432 GR (0.2)), A21741A (NCA445432 GR (0.5)), and A20780A (Zyrox Granular Fly Bait) caused ≥90% mortality within 96 hr for each product [Appendix 1].
- Exposure of house flies to 0.2 g/cage aged A21740A caused ≥90% mortality within 48 hr, and to not aged A21740A within 48 hr. Exposure of house flies to 0.2 g/cage aged A21741A caused ≥90% mortality within 48 hr, and to not aged A21741A within 48 hr. Exposure of house flies to 0.2 g/cage aged A21746A did not cause ≥90% mortality within 48 hr, nor did to not aged A21746A within 48 hr. Exposure of house flies to 0.2 g/cage aged Zyrox caused ≥90% mortality within 72 hr, and to not aged Zyrox within 48 hr. Control mortality did not equal or surpass 10% during the study [Appendix 2].
- Exposure of house flies to the baits and aging periods indicated caused ≥90% mortality within the number of hours reported in Table 1 [Appendix 3].
- Exposure to 1.6 or 3.2 oz/1000 square foot A21741A fly bait (0.5% indoxacarb) at a.i. rates of Maryland and Georgia tests: 0.23 mg/cage indoxacarb or 0.45 mg/cage indoxacarb; California test: 0.5 mg/cage indoxacarb or 1.0 mg/cage indoxacarb caused ≥90% mortality within 48 hr at each test site. The lethal time to 90% mortality was 24.9 and 24.6 hr for the 1.6 and 3.2 oz/1000 square foot application rates, respectively in the Baltimore test, (Table 2 = Table 4 of MRID), 18.3 and 20.4 hr (Table 3 – Table 2 in MRID) in the Modesto test, and 2365.312 minutes (= 39.42 hr) for the 1.6 oz/1000 square foot rate in the Meansville test. [Appendix 4].
- Exposure of house flies to A21741A (0.046 = indoxacarb low rate, 0.091 = indoxacarb middle rate, and 0.182 = indoxacarb high rate g/square foot bait, indoxacarb a.i. percentage not reported), Zyrox (0.092 g/square foot bait, active ingredient identity and concentration not reported), and QuikStrike (0.227 g/square foot bait, active ingredient identity and concentration not reported) caused ≥90% mortality (survival not greater than 0.10) within 96 hr. Exposure of house flies to A21741A (0.046 = indoxacarb low rate, 0.091 = indoxacarb middle rate, and 0.182 = indoxacarb high rate g/square foot bait, indoxacarb a.i. percentage not reported), Zyrox (0.092 g/square foot bait, active ingredient identity and concentration not reported), and QuikStrike (0.227 g/square foot bait, active ingredient identity and concentration not reported) caused 90% mortality at number of minutes estimated (LT90) in Table 2 [Appendix 5].
- Exposure of house flies to A21741A (0.5% indoxacarb) at 1.6 oz/1,000 square feet (0.015 g, 0.075 mg/jar indoxacarb), 3.2 oz/1,000 square feet (0.030 g, 0.15 mg/jar indoxacarb), 6.4 oz/1,000 sq ft (0.060 g, 0.30 mg/jar indoxacarb), and blank A21741A lacking indoxacarb or Zyrox Fly Bait applied at 3.2 oz/1,000 square feet (a.i. identity and concentration not reported) caused ≥90% mortality within 24 hr (Table 1 = Table 2 of MRID) and Maxforce Fly Bait applied at 5.7 oz/1,000 square feet (a.i. identity and concentration not reported) caused ≥90% mortality within 30 min [Appendix 6].
- Exposure of house flies to A21741 applied at 1.6 oz/1,000 square feet (0.05 g/cage) caused ≥90% mortality within 120 hr; to A21741 applied at 3.2 oz/1,000 square feet (0.09 g/cage) within 96 hr; and to A21741 applied at 6.4 oz/1,000 square feet (0.18

g/cage) within 120 hr. Exposure of house flies to Zyrox applied at 3.2 oz/1,000 square feet (0.09 g/cage) or QuickBayt (0.50% imidacloprid + 0.10% Z-9-tricosene) applied at 5.7 oz/1,000 square feet (0.16 g/cage, 0.8 mg/cage imidacloprid + 0.16 mg Z-9-tricosene) did not cause ≥90% mortality within 120 hr. Control mortality, A21746 (blank) applied at 3.2 oz/1,000 square feet (0.09 g/cage, no active ingredient) did not cause ≥10% mortality within 120 hr [Appendix 7].

- Exposure of house flies to granular fly baits indicated in Table 2 caused ≥90% mortality within the number of hours indicated, and the LT_{90} values are presented. [Appendix 8].
- Exposure of house flies to 3.6 g of A21741A (0.5% indoxacarb; 18.0 mg/kitchen indoxacarb) at 1.6 oz/1000 square feet, 7.2 g of A21741A (0.5% indoxacarb; 36.0 mg/kitchen indoxacarb) at 3.2 oz/1000 square feet, and 14.4 g of A21741A (0.5% indoxacarb; 72.0 mg/kitchen indoxacarb) at 6.4 oz/1000 square feet caused ≥90% mortality within 48 hr, while exposure of house flies to 7.2 g of Zyrox Fly Bait (0.5% cyantraniliprole; 36.0 mg/kitchen cyantraniliprole) at 3.2 oz/1000 square feet, and 13.0 g Maxforce Fly Bait (0.6% imidacloprid; 78.0 mg/kitchen imidacloprid) at 5.7 oz/1000 square feet caused ≥90% mortality within 24 hr [Appendix 9].
- Exposure to 4.54 g of A21741 at 1.6 oz/1000 square feet, 9.07 g of A21741 at 3.2 oz/1000 square feet, 18.14 g of A21741 at 6.4 oz/1000 square feet, 9.07 g of Zyrox Fly Granular Bait at 3.2 oz/1000 square feet, and 22.7 g of QuikStrike Fly Bait at 4 oz/500 square feet caused ≥90% mortality to house flies within 24 hr [Appendix 10].
- Exposure of house flies to 7.4 g/kitchen Zyrox Fly Bait (A20780A, 0.5% cyantraniliprole, 37.0 mg/kitchen cyantraniliprole) at a rate of 3.2 oz/1000 square feet applied as a scatter caused ≥90% mortality within 24 hr, the same amount of Zyrox applied in an FBS bait station (37.0 mg/kitchen cyantraniliprole) caused ≥90% mortality within 72 hr, 7.4 g/kitchen indoxacarb fly bait (A21741A, 0.5% indoxacarb, 37.0 mg/kitchen indoxacarb) at a rate of 3.2 oz/1000 square feet applied as scatter caused ≥90% mortality within 48 hr, the same amount of A21741A applied in an FBS bait station (37.0 mg/kitchen indoxacarb) did not cause ≥90% mortality within 72 hr, an unreported amount of blank bait (A21746A INDX) applied as scatter caused ≥10% mortality within 72 hr, an unreported amount of blank bait (A21746A INDX) applied in FBS station caused ≥10% mortality within 72 hr, and an unreported amount of Maxforce Fly Bait (0.5% imidacloprid) applied in an FBS station caused ≥90% mortality within 72 hr [Appendix 11].
- Exposure of house flies to A21746 fly bait (blank) as scatter or in bait stations did not cause ≥10% mortality within 168 hr. Exposure of house flies to A21741 bait caused ≥90% mortality within 24 hr as a scatter application and within 48 hr in bait stations. Exposure of house flies to Zyrox bait caused ≥90% mortality within 24 hr as a scatter application but did not cause ≥90% mortality within 168 hr in bait station applications. Exposure of house flies to Maxforce Flay Bait in bait stations did not cause ≥90% mortality within 168 hr [Appendix 12].
- Baiting with Indoxacarb Fly Bait (0.5% indoxacarb) dispensed at a rate of 6.4 oz/1000 square feet at an a.i. rate of 0.975 g/100 square meters indoxacarb caused ≥90% reduction in house flies recovered in sticky traps relative to initial counts within 2 weeks [Appendix 13].

- Exposure of house flies to Agita 1GB (1.0% thiamethoxam) and Zyrox (0.5% cyantraniliprole) caused ≥90% mortality within 24 hr, while exposure to A21741A (0.5% indoxacarb) caused ≥90% mortality within 48 hr [Appendix 14].
- Exposure of house flies to granular or paint-on bait treatments listed in Table 2 and 3 did not cause ≥90% knockdown within 240 minutes. Exposure of house flies to granular A21741A at 180 mg/pavilion indoxacarb 4 caused ≥90% mortality within 24 hr, and exposure to paint-on formulations of A21741A at 180 mg/pavilion indoxacarb, A21741A at 90.0 mg/pavilion indoxacarb and Zyrox at 180 mg/pavilion cyantraniliprole caused ≥90% mortality within 24 hr [Appendix 15].
- Exposure of house flies to Zyrox paint-on treatments resulted in ≥90% mortality within 96 hr for the 48gpr/100 ml treatment, and within 48 hr for the 96gpr/100 ml, 144gpr/100ml, and Zyrox scatter bait treatments [Appendix 16].
- Exposure to the Zyrox and Maxforce treatments caused ≥90% mortality within the number of hours indicated in Table 1 [Appendix 17].

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 50528519. Advion® Fly Bait (A21741A) - Efficacy Data to Support Use of Advion Fly Bait for Control of Blow Fly, B. Cartwright, 2019.

OCSPP Product Performance Guideline: 810.3500

Product Name: Advion Fly Bait
EPA Reg. No. or File Symbol: 100-RALL
Decision number: 547950
DP number: Not provided

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: Efficacy 2-1

Primary Reviewer:
Gene Burgess, Ph.D.

Signature: Gene Burgess ae
Date: 06/12/2019

Secondary Reviewers:

Signature: _____
Date: _____

Robert H. Ross, M.S., Project Manager

Signature: Robert H. Ross ae
Date: 06/12/2019

Quality Assurance:
Angela M. Edmonds, B.S.

Signature: Angela M. Edmonds
Date: 06/12/2019

Disclaimer

This review may have been altered subsequent to the contractor's signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-16-019

EFFICACY STUDY DATA EVALUATION RECORD (COMPLETED STUDY) - Registration

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP GUIDELINE NO: 810.3500]
MRID:	50528519. Advion® Fly Bait (A21741A) - Efficacy Data to Support Use of Advion Fly Bait for Control of Blow Fly, B. Cartwright, 2019.
DP BARCODE NO:	Not provided
DECISION NO:	547950
CONFIDENTIALITY CLAIMS:	None
GOOD LABORATORY PRACTICE:	Since this volume is a summary of the attached files, Appendix 1, a Good Laboratory Practice Compliance Statement according to 40 CFR Part 160 is not applicable. There is no GLP study director for this volume.
SUBJECT PRODUCT:	PRODUCT NAME: Advion Fly Bait EPA REGISTRATION NUMBER OR FILE SYMBOL: 100-RALL FORMULATION TYPE: Granular bait ACTIVE INGREDIENT NAME: Indoxacarb 0.5 % [PC CODE: 067710] PRODUCT APPLICATION RATE(S) AS LABELED AND AS APPLICABLE TO THIS MRID: Flies, including house fly, blow fly, fruit flies: Granular: 1.6 to 6.4 oz/1000 square feet; Diluted paint on: dilute 30 to 40 grams bait in 30 ml water and apply as a spot treatment of 6 to 12-inch wide bands. ACTIVE INGREDIENT APPLICATION RATE(S): Flies, including house fly, blow fly, fruit flies: Granular: 227 to 907 mg/1000 square feet; Diluted paint on: not calculable on per-area basis.

Efficacy Study Data Evaluation Record

Purpose of study

The purpose of the study was to evaluate the efficacy of Advion Fly Bait to blow flies.

Materials and Methods

This study was conducted in Stein, Switzerland against a species of relevance in the United States. Advion Fly Bait (0.5% indoxacarb) was placed in three portions totaling 0.696 g into five replicates of 60 by 58 by 60-cm (360 square cm floor area) transparent cages containing water and 0.696 g powdered milk and 0.696 g sugar to approximate an application rate of 2 g/square meter or 6.4 oz/1000 square feet at an a.i. rate of 3.48 mg/cage indoxacarb, while a negative control consisted of cages supplied with only water, sugar and powdered milk. Blow fly (*Calliphora* spp.) were purchased as larvae from a local bait shop, and reared to adult stage at 26 °C (pesticide susceptibility status not reported). One to two days after eclosion, 50 (25 male and 25 female) flies were released into each cage, and morbidity (unable to make coordinated movements, moved slowly, or moved only when stimulated) and mortality (no movement in response to stimuli) were observed at 1, 2, 24, 48, and 72 hrs. The test proceeded at 23.9 °C and 35% RH. Only mortality data are reported in the summary table, while morbidity was recorded separately. The data were not statistically analyzed.

Results

Exposure of blow flies to Advion Fly Bait (0.5% indoxacarb) at an a.i. rate of 3.48 mg/cage indoxacarb caused ≥90% mortality within 72 hr exposure (Table 1). Control mortality did not equal or surpass 10% within 72 hr. The summary table matches the raw data.

Table 1. Mean percentage blow fly mortality at hours post introduction to bait

	Hours post introduction				
	1	2	24	48	72
Indoxacarb Fly bait A21741	0	0	0	74.8	100
Control	0	0	0.4	0.4	1.2

The author does not report any amendments to or deviations from the protocol.

Conclusions

Exposure of blow flies to Advion Fly Bait (0.5% indoxacarb) at an a.i. rate of 3.48 mg/cage indoxacarb caused ≥90% mortality within 72 hr exposure.